

THE BRITISH COLUMBIA COMMITTEE ON THE UNDERGRADUATE PROGRAM IN MATHEMATICS AND STATISTICS

MINUTES OF THE 93RD MEETING, MAY 12 – 13th, 2015

TUESDAY, MAY 12, 2015

Plenary Session

1. WELCOME

Don Noakes, Vancouver Island University Dean of Science and Technology, welcomed the BCcupms to its 93rd meeting at Vancouver Island University in Nanaimo, BC.

2. ADOPTION OF THE AGENDA FOR THE 93RD MEETING OF THE BCcupms

The Agenda for the 93rd Meeting was approved by consensus after agreeing to the following changes:

- Addition of item 6.6 - Pending requests in the Transfer Credit Evaluation System (TCES)
- Addition of item 6.7 Retiring of the Calculus I and II equivalencies among sending institutions
- Addition of item 6.8 Mathematics Flexible Pre-Major, last reviewed 2011
- Item 22.3 (Webmaster) moved to 4.6

3. APPROVAL OF THE MINUTES OF THE 92ND MEETING, HELD AT KWANTLEN POLYTECHNIC UNIVERSITY

Motion: (moved by Justin Gray and seconded by Gera Belchev)

That the Minutes of the 92nd Meeting be approved.

Carried unanimously.

4. ANNOUNCEMENTS

4.1 Introduction of representatives

4.2 Attendance Lists: Nora Franzova circulated the attendance lists.

4.3 Announcements from the hosts: Glen Pugh provided information on internet access and logistics for the meeting.

4.4 Notice of Election: At this meeting, elections for the Vice-chair and Secretary of the BCcupms will be held. These have two-year terms. Susan Milner, Susan Chen and Susan Oesterle volunteered to form the nominating committee.

4.5 We need someone to organize our Sharing Mathematics Conference next year. Susan Milner.

Gary MacGivally and Jane Butterfield (UVic) volunteered to organize the Sharing Mathematics Conference to be held at Columbia College in May 2016.

4.6 We need a new webmaster. Stephen Benecke (stephen.benecke@gmail.com) volunteered to be the new webmaster as Ian Affleck is stepping down from this position.

4.7 Conferences: Members of the committee shared information about upcoming conferences that might be of interest to the group. These included the Canadian Math Education Study Group (CMESG) meeting in Moncton June 5-9, 2015, the Undergraduate Computing Science Conference in Kelowna in July at UBCO and a Webassign conference coming up in New York. Sharing Math 2015 will be held at VIU on May 14. See attendance list page 22.

5. Report from the Ministry of Education: Melissa Horner

5.1 Ministry website http://www.bced.gov.bc.ca/irp/transforming_curriculum.php

Melissa will be filling in for a manager position in student certification, and a teacher will be seconded for the mathematics curriculum position. She will still be the main contact for the BCcupms group.

5.2 Curriculum transformations of the senior secondary grades; transitions of students to post-secondary education.

See item 5.3

5.3 The status of provincial required examinations.

Currently, most provincial exams take place in Grade 10 with additional provincial exams of Social Studies in Grade 11 and English in Grade 12. The ministry is thinking of changing the exams at the Grade 12 level to one math and one language arts. Deanna Baxter expressed concerns about the ability of postsecondary institutions to place students appropriately in university level courses.

5.4 New curriculum directions, see <https://curriculum.gov.bc.ca/>.

Melissa shared that the K-9 draft was posted October 2013 and feedback was provided on the draft in a number of ways. Feedback that was received from Oct 2013 – Sept 2014 was analyzed for revision team purposes and the ministry will continue to receive and monitor incoming feedback. The feedback report is available on the curriculum site.

Next steps: The K-9 revision and 10-12 curriculum outlining teams were put together over the winter, and math curriculum meetings started in Feb 2015. The K-9 revision team is focusing on: clarity, elaborations, continuity, content amount, highlighting the presence of math foundation, and bringing First Peoples Principles of Learning into the curriculum. The 10-12 team is focusing at the 10 or common required learning level, trying to find a solution for some of the concerns about the Apprenticeship and Workplace courses.

Currently, the 10-12 team has developed two proposed models: 1) one that requires small changes to the current curriculum, and 2) a common math 10 course.

The Ministry will be sharing the two models with focused review groups in order to collect feedback which will then be shared back with the 10-12 outlining team.

Next steps: posting revised K-9 drafts over the summer and 10-12 outlines in late summer/early fall.

5.5 Curriculum transformations of the elementary grades which may affect the teaching of Mathematics for Elementary Education.

Melissa is a member of a CMEC pan-Canadian group on mathematics curriculum and assessment; Melissa tried to obtain information from the group to share with BCcupms for Nora Franzova's report, but this has not been successful.

5.6 Tracking online high school students.

Melissa reported that an average of 8% of students who are enrolled in mathematics courses are enrolled in Distance Learning (DL) mathematics courses. The highest numbers of DL mathematics enrolment are for Pre-Calculus 11 and 12. The enrolment numbers do not indicate if the student has been enrolled in the course before. For example, the student could have taken the course in a face to face classroom once or twice before completing the course via DL.

It is possible to obtain completion numbers, but completion just means that the course has been closed for the student; it does not provide the student's mark or if they passed the course.

Members expressed an interest in how students did in those courses and whether you could track how they did following online courses. Melissa shared that students taking DL courses are normally associated with a physical school and, as a result, their grades are shown on a transcript with no indication whether the course was taken face to face or by DL. Many students prefer this process and would prefer not to have their transcript reflect having taken the course in a non-classroom format.

Nora Franzova asked about the report of eliminating letter grades for high school students. Melissa reported that this is part of a larger discussion but at this point no decisions have been made. Deanna Baxter asked about the K-12 Transitions Project and the dual credit opportunities. Melissa suggested this topic be put on the agenda for the next meeting in 2016 at which time she would have more information about these topics.

6. BCCAT— John FitzGibbon

John reported that, starting next year, the Associate of Science and Associate of Arts degree programs will be permitted to be more flexible. They will be able to include courses that can be articulated with any course in a degree program at a teaching intensive university, not just courses at the larger research universities (i.e. UBC, SFU, UVic, UNBC). Also, the lab science requirement will be removed from the Associate of Arts degrees and the math requirement will be broadened in Associate of Arts degrees to include courses such as formal logic. There is an Applied Associate Degree being considered which can have a focus in engineering, computing science, etc. and there may be opportunities for associates' degrees in specialized areas.

John shared that there is a new report Dual Credit available on the BCCAT website and that reports on experiential learning and on academic advising will be available in the near future.

6.1 2014 and 2015 JAMs.

6.2 Leo Neufeld is a recipient of the Franklin Gelin Lifetime Achievement Award. Nora Franzova presented Leo a "Klein Stein" as a token of the group's congratulations.

6.3 Upper Level Transfer Credit (requested by Susan Oesterle) Can students transfer 3rd and 4th year course?
John reported there are no rules against 300 and 400 level courses receiving transfer credit. Wayne Nagata reported that Calculus IV courses receive a 3rd year transfer at UBCV. UVic also allows transfer of 300 and 400 level courses. Most institutions have a residency requirement so most students are limited in the number of courses they can transfer.

6.4 Instructor qualifications for upper level course transfer. For BCCAT's current position, see <http://www.bccat.ca/articulate/request/instructor>
Master's in subject or related subject for first and second year. Jim Bailey suggested we start thinking about possible guidelines from this group. For articulation purposes, it is the course content that is articulated, not the qualification of the instructor and individual institutions assign instructors on an honour system.

6.5 Appointment of Susan Oesterle as BCCAT System Liaison Person (SLP) to the BCcupms. For a description of responsibilities, see <http://www.bccat.ca/companion/committee/slp>
Jim Bailey shared that the duties of the SLP include meeting with other Arts and Sciences deans so that issues from our group can be brought to the attention at the deans' level and, in turn, can bring results of those discussions back to this group.

Motion: (moved by Susan Milner and seconded by Susan Chen)

That Susan Oesterle be appointed as the SLP to the BCcupms.

Carried unanimously.

6.6 Pending requests in the Transfer Credit Evaluation System (TCES)
Since the list of pending requests is very small, the list was not circulated.

6.7 Retiring of the Calculus I and II equivalencies among sending institutions:
<http://bctransferguide.ca/program/math/calculus>
John reported that this list will be archived but no longer in use.

6.8 Mathematics Flexible Pre-Major, last reviewed 2011
<http://www.bccat.ca/pubs/FlexPre-MajorRevision2011.pdf>
Jim Bailey shared the current version of the Mathematics Flexible Pre-Major as published in the above website and asked in any changes have been made to mathematics majors programs that would affect the report. Gary MacGillivray reported that at UVic, Differential Equations will be substituted by a different course and that some other second year courses may be revised.

A committee was struck to review the Mathematics Flexible Pre-Major. Justin Gray, who will act as the chair of the committee, Nora Franzova, Michael Nyenhuis, Gary MacGillivray and Wayne Nagata. They will report the results of their review at the next BCcupms meeting.

7. INSTITUTIONAL REPORTS

ALEXANDER COLLEGE – Krishna Subedi

We have reviewed and revised our 'Learning Objectives' for all our math courses, incorporating mostly 'housekeeping' changes" and also painting the purpose of the course with broader strokes than the detailed list of topics that are more appropriate for the 'Course Content' part of the curriculum guide.

The revised math 100 workshops ran for the first time last Summer term. Students who do poorly on a Math 100 diagnostic test must take the workshops or their marks will be penalized. We have now run them for a full year and are beginning a statistical analysis of the results in terms of their effect on student achievement. In any case, our math instructors are enthusiastic about the work the two math tutors we have hired for the workshops.

The Differential Equations course (Math 255) has been approved and is now part of our annual offerings. With this we now have all the core courses required for a flexible pre-major program. We are investigating the possibility of adding one or two other courses common to existing flexible pre-major programs in B.C.

We have added an extra hour of instruction in our math classes and that seems to be something both the instructors and students like.

We are now teaching an introductory stats course (SAT 200) and have hired a special instructor to teach it.

ASCENDA SCHOOL OF MANAGEMENT – Joyce Kwan

Acsenda School of Management is a private degree granting institution that has been offering a Bachelor of Business Administration (BBA) degree for ten years. Renewal of consent for the BBA was granted for another five years in 2014. The BBA has five concentrations: Accounting, Human Resources Management, International Business Management, Marketing Management and General Business Management. Acsenda also has approval to offer a Bachelor of Hospitality Management degree due to open in April 2016.

In June 2014, Dr. Lindsay Redpath joined Acsenda as the new President and Vice Chancellor. The former Vice President Academic, Dr. Bill Garrett, has retired and Dr. Tess Ireneo-Manalo continues to provide leadership as Dean of Business and Campus Principal. The governing body is the Academic Council that includes six external members, faculty members, and student and alumni representatives.

A new Director of Library, Information, Technology and Instructional Services was hired in August 2014. Adam Farrell, who has a Master's degree in Library and Information Studies and in Archival studies is an experienced librarian who has greatly enhanced the library resources, services and usage. Acsenda recently became a member of the BCELN (BC Electronic Library Network).

During an intensive review of the curriculum in 2013-14 the faculty identified a set of five program level learning outcomes which are being incorporated into course learning outcomes and assessment. An English bridging program introduced two years ago has been improved and the two lower level English for Academic Purposes (EAP) courses have been eliminated. Enrolments at Acsenda have grown significantly in the last year. There are currently 180 students at Acsenda most of whom are international students from over 20 different countries. The largest group of students is from China, followed by Korea, India and Latin America. Acsenda also has a significant number of students from Eastern Europe. Cultural diversity, along with managing classes where students have a range of post-secondary experiences, is a challenge for the 15 part time and 5 full time faculty members who teach at Acsenda.

Acsenda has recently completed consultations with faculty, students, alumni and staff regarding the development of a new three year strategic plan. One of the objectives is to expand the number of transfer credits accepted for transfer credit by other institutions. We trust that our continuing participation in the annual BCCAT articulation meetings will result in a better understanding of the quality and comparability of our courses in the different subject areas.

BC INSTITUTE OF TECHNOLOGY – Laura Billing

There have been no significant changes to BCIT mathematics and statistics courses in the past year. Enrolment is stable. We are developing a few new courses for the new Bachelor of Engineering in Mining and Mineral Resource Engineering degree. We may apply for articulation for the Calculus I and II courses.

CAMOSUN COLLEGE – George Ballinger

1. As of September 2014 the name of our department officially changed from “Mathematics” to “Mathematics and Statistics” to better reflect the importance and distinctiveness of statistics within our department (we have several statistics faculty members and offer five different statistics courses).
2. Effective September 2015 the course abbreviations of our statistics courses are changing from MATH to STAT. In particular our statistics courses MATH 116, MATH 216, MATH 218, MATH 219 and MATH 254 are renamed STAT 116, STAT 216, STAT 218, STAT 219 and STAT 254, respectively. These courses are otherwise unchanged.
3. We plan to redesign our second year calculus courses to reflect changes made by UVic while maintaining transferability to other BC postsecondary institutions. We plan to make minor changes to MATH 220 (Multivariate Calculus) by adding the topic of Multivariable Taylor Series. We also intend to replace our MATH 225 (Introduction to Differential Equations) course with a new course, MATH 226 (Elementary Differential Equations), which will include all the content from MATH 225 plus many new topics. Together, as a pair, our revised MATH 220 and new MATH 226 courses will cover all the content of UVic's new Calculus III and Calculus IV courses. Our courses should also independently transfer to UBC, SFU and other BC postsecondary institutions.
4. Programs throughout Camosun College recently underwent an extensive review, referred to locally as “Program Mix Analysis.” Following several years of budget cuts, during which time we feared cuts to our second year courses, we were pleased to learn that all A&S programs would be maintained for the coming year and that our department was singled out for modest expansion.
5. Enrolment in our courses, including second year courses, is up somewhat from last year.
6. Sherri Bell was appointed the new president of Camosun College. She takes over from Peter Lockie who has been interim president for the past year after the departure of former president Kathryn Laurin. Bell was superintendent of Greater Victoria School District 61.
7. Patrick Montgomery joined our department last year.
8. Jill Britton is retiring after teaching for 25 years at Camosun and 50 years throughout her career. Jill primarily taught math for elementary teachers. As a result of her retirement we have a posting for a full-time math instructor position, the closing date for which is May 20, 2015.
9. For six of the past seven years we offered one section of MATH 100 (Calculus 1) at a local high school in partnership with south Vancouver Island school districts, referred to as South Island Partnership (SIP). For 2014-2015 the number of such sections of MATH 100 grew to four, serving three different high schools.
10. Formerly tuition-free academic upgrading courses (including our MATH 072/073 courses, which are equivalent to grade 11 math) will, beginning September 2015, charge tuition.
11. Several faculty members in our department are exploring WeBWorK, which we have hosted locally, and are developing online assignments using the free, open-source homework system.

CAPILANO UNIVERSITY – Deanna Baxter

Tutorials were added to Math 105 – Precalculus and Math 116 – Calculus I so that instructional time will be increased to 5.5 hours per week. Credits were increased in these courses from 3 to 4. One of the goals of these changes is increased student success.

We have replaced a 1 credit/2 credit combination of algebra courses (Math 091/096) with a single 3 credit course (Math 097) which will serve as a new prerequisite for Math 105 – Precalculus. The attrition in a single semester from 091 to 096 was too high to sustain in a scenario of initial low enrolments.

Applications to our two engineering programs (First Year Transfer and the two year Engineering Transition) are up and we have permission to accept 35 more students, from 70 to 105. This should have a positive impact on math enrolments.

Overall enrolments in math were down in 2014/15 which is the trend we have been experiencing in recent years. Capilano University has developed an Academic Plan, a Strategic Plan and a Strategic Implementation Plan and we will see changes in the future potentially to structure and offerings. Sciences overall is healthy and we are working to develop programs in math and sciences that will fit well with potential new directions at Capilano.

Frank Harris, a member of the Mathematics and Statistics department, is retiring. Paul Ottaway (formerly at TRU) has completed his first year as a full time regular faculty member.

COLLEGE OF NEW CALEDONIA – Tracy Wall

1. No new courses or course content changes which would ramify on articulation agreements.
2. No personnel changes. In certain areas of the College layoffs have occurred recently, and these could ramify on us (because anyone with a pink slip in hand can teach mathematics, as we know). We have our fingers crossed. We have fought a long and hard political battle to recover a full-time position in university-credit mathematics (after years of attrition caused by layoffs and the use of part-timers to reduce costs) and we do not intend to lose that position (and the person currently holding it) without a fight.

3. Stable number of sections offered, but lowish enrollment in some (peripheral) courses. Good political support from our Dean and Associate Dean to maintain a decent cross-section of courses in our program.
4. The new President of CNC is Mr. Henry Reiser, who arrives here via Kwantlen Polytechnical University and an earlier incarnation of Thompson Rivers University. Mr. Reiser has a background in engineering and technology. The usual reorganization associated with such an appointment is taking place, but this time it looks - at first glance, at least - to be sensible.

COLLEGE OF THE ROCKIES – Jim Bailey

Next year (for the first time in a long time) College of the Rockies will offer all their first and second year Mathematics and Physics courses, including Astronomy. We will also be hiring an engineering instructor who will also teach some mathematics and physics.

COLUMBIA COLLEGE – Himadri Ganguli

Columbia College has been awarding Associate Degree in Arts and Science since September 2005. We are now offering Associate degree in Arts and Science with different concentrations namely :

1. Associate of Arts Degree, Business Administration Concentration
2. Associate of Arts Degree, Economics Concentration
3. Associate of Arts Degree, Mass Communication Concentration
4. Associate of Science Degree, Computer Science Concentration
5. Associate of Science Degree, Mathematics Concentration

In the last year there is a constant growth in enrollment and consequently in the number of instructors. The Mathematics Department is one of the departments with the biggest growth. As a result in Winter 2015 Mathematics/Computer Science became a single new division splitting out from the Math/Science division.

In Mathematics, we are offering at least one second year course every semester to facilitate students accumulate credits to qualify for an Associate Degree in Science.

In Winter 2015 we have offered three second year courses, MATH 206 - Mathematical Statistics with Applications, MATH 230 - Introduction to Ordinary Differential Equations and MATH 252 - Linear Algebra and Differential Equations.

In summer 2015, we are offering MATH 213 - Calculus 3, MATH 225 - Introduction to Mathematical Analysis and MATH 252.

Since Fall 2013, we are offering a new non-credit course, Math 090 (four hrs/week) - Developmental Mathematics, for those students who are very weak in Math.

We will be hosting the Articulation meeting in 2016.

COQUITLAM COLLEGE – Gera Belchev

There have not been any course changes that would influence transfer agreements and the enrolment has been steady for the past year at Coquitlam College.

DOUGLAS COLLEGE – Wesley Snider

Enrolments are good. We added a small number of one-time-only demand sections over the past year. We have also hired two new probationary faculty members: Mark Schurch and Erin Moulding.

A new calculus for biological sciences course is starting to go through our internal approval process and we are in discussions with the University of Waterloo to articulate a one-year block transfer.

Computing science courses have been relocated to the mathematics department from Commerce and Business, until an independent computer science department can be established; we will be advertising for a part-time computer science instructor this summer.

A new diploma, Engineering Essentials, is in the final stages of the approval process.

KWANTLEN POLYTECHNIC UNIVERSITY – Michael Nyenhuis

KPU launched its B.Sc. in Applications of Mathematics, and I believe the program already has about 10 students. KPU will be moving from a 14 week term to a 13 week term. Other institutions may receive a flurry of course outlines from Kwantlen as we try to figure out how to trim 7% from each course.

LANGARA – Nora Franzova

Langara's Math and Stat Department had a fairly stable year. No new courses that would need an articulation were added. We are hoping to articulate our Math1170 course with UBC, since there is a lower level course that gives students unassigned credit at UBC, it would be nice if this course (Math1170) was also worth some credit.

Enrolment in Calculus for business is declining, but enrolment in Calculus for Sciences is increasing. We speculate that it might be due to the fact that our international students are now more interested in studying sciences than studying business. Enrolment in Math1190 (Math for Elementary Ed.) has declined in the past 2 years, We now offer only 2 sections per year, where we used to offer 4 sections.

Langara is now offering several PDD (Post Degree Diploma) programs, where the business one has brought work for our Statisticians. (read more in the Stat report.)

College is working on developing a Bioinformatics program (with a Bachelor's Degree). This will bring more students to several math and stats classes.

This past year, as outreach we visited 3 elementary schools with our Math Fair - projects presented by students of Math of Elementary Ed. We hosted AMC (American Math Contest), BC Secondary School Math Contest and the regional Science Fair. We hope to the same next year.

NICOLA VALLEY INSTITUTE OF TECHNOLOGY – No representative sent

NORTH ISLAND COLLEGE – Jason Diemer

There are no changes to NIC course offerings with transfer implications. The new Dean, University and Applied Studies is Greg Cran. The new Department Chair, Mathematics and Science is Michael Willers.

Engineering courses are concentrated at the Comox Valley campus, leading to strong enrolments in math and physics there. Enrolment at the other campuses has remained soft. Math 102 (Calculus for the Life Sciences) and 151 (Finite Math) have been growing steadily from year to year, and both are now available at all campuses by ITV. Math 122 (Logic and Foundations) was run for the first time in Winter 2015.

NORTHERN LIGHTS COLLEGE – No representative sent

NORTHWEST COMMUNITY COLLEGE – Fred Mistry

University Credit Transfer Courses

Math 101: Calculus I

Math 102: Calculus II

Math 115: Pre-Calculus – Video Conference from Terrace

Math 190: Principles of Mathematics for the Elementary Teacher - Online and face to face

Math 131: Introduction to Statistics

Textbooks:

Math 101/102: JAMES STEWART. Essential Calculus Early Transcendentals, Second Edition

Math 115: M. Sullivan, Pre-calculus. 9th edition

Math 131: M. Triola, Elementary Statistics, Canadian 3rd edition

Math 190: O'Daffer et al. Mathematics for Elementary School Teachers

Software: Maple 17 and D2L for online offerings.

Enrollment 2014-15:

Rupert Campus: Math 101(6), Math 102(2), Math 131(9)

Terrace Campus: Math 101(28), Math 102(7), Math 131(36)

Online: Math 190(18)

Video Conference: Math 115(12)

Enrollment 2015-16: No information yet.

Math Lab: Math 101/102 now has an additional 3 hours per week for tutorials.

OKANAGAN COLLEGE – Jason Schaad

Some notable events and information about the Okanagan College department of Mathematics and Statistics are:

- There are no substantial curriculum changes this year. The only minor change was to change the prerequisite of Math 122 (Calculus II) for Math 251 (Discrete Structures) to a co-requisite.
- The Sustainable Construction Management Technology at the Penticton campus ran and was quite successful. Since it was based on one time funding (over a 3 year period), we are not currently planning on offering the math course for the program next year. The hope of the College is that the program becomes permanent.
- Enrolment in Mathematics and Statistics was up over the last year, with a slight increase in UT Math/Stats and a slight decrease in business. There was a significant increase in second year enrollments, especially Calculus III, Linear Algebra and Mathematical Structures and Proofs. Currently, applications in Science are up about 25%, Business up about 10%, CIS up 20% with overall applications up 8% (all Kelowna numbers). Non Kelowna campuses are roughly the same as last year. Despite strong enrollment and application numbers, we are still feeling the budget crunch.
- We are now offering 3 sections of Calculus I in the fall and 1 in the winter with 2 sections of Calculus II in the winter and 1 in the summer. These were all filled to capacity. We offer Calculus III in the fall and are hopeful that we may need to add an additional section. We are also going to offer an additional section of Math 251 (Discrete Structures) in the hopes of reducing class sizes.
- We converted one new full-time faculty member to replace Clint Lee, who will be retiring this summer. His replacement is Jason Schaad, a graduate of UBCO. Through a confusing series of moves, Jason will be based at the Penticton campus for now.
- While we had Jason's previous work assignment covered by non-continuing faculty, our department finds ourselves short staffed due to members being active in committees and projects that require time release. We are in the early stages of hiring right now. Typically, we have enough non-continuing work to make up over one full workload. We have far more than that this year (and I suspect next, too).
- We ran SNAP Math Fairs at the Kelowna, Vernon and Penticton campuses this year. The events have been successful and will be continued. At all three campuses, students from OC MATH 160 – Math for Elementary School Teachers – are involved.
- We continue to host the Math Challengers event for the Okanagan Region. Satoshi Tomoda is the principle organizer.
- Of course, we continue to partner with UBCO for the BC High School Mathematics Contest. We will likely be lost moving forward as we lose Clint Lee's 25 years of experience in a couple of months.

SELKIRK COLLEGE – Doug Henderson

Selkirk continued to see a dramatic increase in our Calc I/Calc II courses from our low of 2 years ago (Calc I enrolment has almost doubled from the high 30s to the high 60s). This is largely due to a full 1-year engineering transfer programme (just completed its second year after being suspended previously), as well as our new Rural Pre-Medicine programme (our first intake just completed their first year). Numbers are also high in our business math and non-calculus based statistics courses due to a major influx of international students (primarily from India) over the past two years.

No new courses are planned for the 2015-16 school year, however a biomedical statistics course will be required for our RPM students during their third year at Selkirk (i.e. for the 2016-17 year).

We may see a fourth section of our Math 160 (a technical math review class for students in our environmental programme) added this upcoming year due to a potential increase in the number of applicants accepted.

Other math courses taught have seen their numbers remain relatively stable over the past few years.

SIMON FRASER UNIVERSITY – Justin Gray

Recent changes to our undergraduate programs.

1. What should we teach in a first Linear Algebra course? Engineering requested us to teach one week on complex numbers in Calc II. We decided instead to teach 2 lectures on complex numbers in Linear Algebra because of their immediate application to eigenvalues and eigenvectors of matrices (which the Engineers also wanted). Also because $\mathbb{C} \cong \mathbb{R}^2$ is a genuine example of a vector space isomorphism. Decided to always teach the google page ranking algorithm in Linear algebra (1 lecture) as a main application.

Recent course outlines:

MATH 232 (2015 Spring)

<http://www.sfu.ca/outlines.html?2015/spring/math/232/d100>

For this one you'll see Complex Numbers; Arithmetic in Cartesian co-ordinates; The complex plane, complex conjugate, magnitude and argument (phase); Polar form, De Moivre's formula and Euler's formula; Roots of quadratic polynomials.

MATH 240 (2015 Spring)

<http://www.sfu.ca/outlines.html?2015/spring/math/240/d100>

2. What do we do to revamp and revitalize Calculus I and II? [MATH 150/151 and MATH 152]

Decision to spend 2 lectures on modelling with differential equations in Calc I (Newton's law of cooling and exponential growth/decay) instead of 1 lecture.

Decision to spend 3 lectures on modelling with differential equations in Calc II instead of 1 lecture.

1 lecture on modelling and review of exponential growth/decay.

1 lecture on first order equations and separation of variables.

1 lecture on population growth models including logistic growth.

To accommodate the change to Calc II we are reducing time on methods of integration (e.g. forms $f(x) = \sin^n x \cos^m x$ and $\tan^m x$ and trigonometric substitution).

We decided not to reduce the time (11 lectures) on Taylor series.

Recent course outlines:

MATH 151 (2014 Fall) use <http://www.sfu.ca/outlines.html?2014/fall/math/151/d100>

I.e. for that one you'll see 3.8 Exponential Growth and Decay; 3.8 Newton's Law of Cooling

MATH 152 (2015 Spring) <http://www.sfu.ca/outlines.html?2015/spring/math/152/d100>

3. What programming and computing skills do we need mathematics majors to know?

Previously mathematics majors had to do CMPT 120 in Python (a first course in programming and computing) plus CMPT 125 in Java (a second course in programming with a focus on object oriented programming and data representation).

We then get our mathematics majors to do a 2 credit course in Matlab with a focus on linear algebra applications and programming skills and a 2 credit course in Maple with a focus on calculus applications and programming skills.

Decision to replace CMPT 125 with CMPT 126 in C/C++ with a focus on algorithms with examples taken from sorting, calculus, discrete mathematics, and probability. This is in the same spirit as the School of Computing Sciences' own decision to also shift the focus away from object oriented programming using Java to algorithms and C/C++.

Recent course outline:

CMPT 126 (2015 Spring) <https://portal.cs.sfu.ca/portal/outlines/1151-CMPT-126-D100/pdf>

which describes briefly the new syllabus (they are still using Java note and not yet C/C++)

4. MATH 125 and 126 - new Calculus courses for Physics majors.

MATH 125 Introduction to Mathematical Methods in the Physical Sciences-1 (3)

Prerequisite: MATH 152 Calculus II

Corequisite: PHYS 125 Mechanics and Special Relativity PHYS 125 (3)

MATH 126 Introduction to Mathematical Methods in the Physical Sciences-2 (3)

Prerequisite: MATH 125

Corequisite: Physics 126 Electricity, Magnetism and Light (3)

The intention is for strong Physics students to get them to do PHYS 125 and PHYS 126 instead of PHYS 120 and 121 and to do PHYS 125 and 126 with the "right calculus material".

The way it was set up is that only highschool students who took AP calculus or IB calculus but not BC Calculus 12 course enrol in MATH 125. This didn't work because only 2 students qualified. We immediately dropped the requirements to allow

students with BC Calculus 12 to enrol in MATH 125 and changed the content of MATH 125 to cover most of MATH 152 Calculus II.

Recent course outlines:

MATH 125 (2014 Fall) <http://www.sfu.ca/outlines.html?2014/fall/math/125/d100>

for MATH 126 (2015 Spring) <http://www.sfu.ca/outlines.html?2015/spring/math/126/d200>

THOMPSON RIVERS UNIVERSITY – Richard Taylor

Math & Stats at Thompson Rivers University have just one item to report that may affect transfer credit. This is the creation of a new course: MATH 1650 (Mathematics for Computer Science) which replaces MATH 1380 (Discrete Structures 1 for Computer Science). This change is in response to a curriculum revision in the Computing Science program. MATH 1650 will cover the following topics: number systems, vectors and matrices, Gaussian elimination, coordinate geometry, and an introduction to probability and statistics.

THOMPSON RIVERS UNIVERSITY (OPEN LEARNING) – Veda Roodal Persad

TRU (Thompson Rivers University) is celebrating 10 years this year. In 2005, the Ministry, after a Core Services Review, took the then BC Open University and the University College of the Cariboo to form TRU. We at the BCOU became the Open learning Division of TRU.

Hence at OL, we have our own courses and programs and we continue to deliver courses that are open, distance and online. Our Math and Stat courses are doing well with a growth of 7% in enrollments and FTES over the last year. We continue to work with the face-to-face TRU Mathematics and Statistics department to align our courses.

At OL there has been a big push to migrate our courses to the online modality but that has softened as we are finding that students prefer the continuous enrolment model over the paced cohort model.

For a profile of our OL students, from the Fact Book 2013-214 for Open Learning, there were 1200 domestic enrolments and 700 international students, 60% of the students are female, and the median age is 31.

TRINITY WESTERN UNIVERSITY – Stephen Benecke

Trinity Western is a fully accredited privately funded public Christian University offering a variety of graduate and undergraduate programs in the arts, humanities, fine arts, sciences, education, theology, and professional studies. Opened in 1962, it currently has approximately 1,400 domestic and 500 international students enrolled full time, as well as 2,000 part time.

The Mathematical Sciences department resides within the Faculty of Natural and Applied Sciences and encompasses Mathematics, Statistics, Computing Systems and Informatics, Physics, and Engineering. It offers degree programs in Mathematics and Mathematics with Computing Science and is also responsible for computing and ISYS programs, Physics, and an engineering transfer program.

A list of current courses offered is available at <https://www.twu.ca/academics/science/mathematics/>. General science students take a concentration in Mathematics to go along with a Chemistry or Biology major. In the past there has also been an influx of students into a Math major who also major in HKIN, Nursing, Music, History, and other subjects. This year there were two graduates with the “Math with Computing major”, and one with the math concentration (general science) and one with a computing concentration (business major).

Most recent changes in course content and schedule has been reported previously. The course Mathematics for Business (Math 101) has been revised to not serve as a prerequisite for Precalculus that Business students can take to satisfy their requirement, but to be designed around the specific needs of the School of Business, more exclusive to these students. Other past changes include the option for students not ready for Math 123 (Calculus) in the Fall to take Math 105 (Precalculus) in the Fall and Math 123 in the Spring. Due to curriculum changes to BC Math 12, the courses Math 105 and 123 have been reviewed and adjusted accordingly.

Average enrolment per year (over the past four years) in first year Mathematics is 19 for Precalculus, 83 for Calculus I, 33 for Calculus II, and 42 for Elementary Education Math. First year Calculus I currently has a 86% success rate. Mathematics for Business has approximately 150 students in the new format. In the last academic years, enrolment in our upper-level mathematics courses have been at record high levels.

The success rates for first year courses are as follows:

Course	Semester	Enrolled	Passed	Percentage
Precalculus	Fall 2014	26	20	76.9%
Calculus I	Fall 2014	54	49	90.7%
Elem. Edu.	Spring 2015	25	25	100%
Calculus I	Spring 2015	33	26	78.8%
Calculus II	Spring 2015	38	34	89.5%

UNIVERSITY OF BRITISH COLUMBIA-OKANAGAN (Mathematics) – Jason Loeppky

UBC Okanagan has just over 8200 undergraduate and graduate students enrolled, which is down slightly from last year. The number who are international students is 11.7% of the total, or just a little over half of the percentage at UBC Vancouver, and a significant increase from last year. Enrollment numbers in Calculus I and II were significantly down from the previous year. There have been no changes to our mathematics courses that will affect transferability.

This year we have had a new external Head for our unit (Mathematics, Statistics, Physics and Computer Science), statistician John Braun.

UNIVERSITY OF BRITISH COLUMBIA-VANCOUVER (Mathematics) – Wayne Nagata

There have been no changes in the past year that affect transfer credit or articulation.

We will continue dealing with transfer credit from Alberta institutions on a case by case basis.

This coming year we will be using locally produced notes and other material for our Calculus 1 and 2 for Science courses, rather than a traditional textbook.

In this coming year we will also be undergoing a review of our mathematics courses taken by engineering students.

BCCUPMS will be notified if this process results in any changes that would affect transfer credit.

UNIVERSITY OF THE FRASER VALLEY – Susan Milner

- As recommended by our program review, we have created an honours program and it has been approved.
- We hosted Math Challengers, Fraser Valley Regionals, (www.apeg.bc.ca/mathchallengers) for the second time this past February, with about 150 students. This is an event aimed at students in grades 8 and 9.
- We have held 3 Math Mania events so far this year with one left to go. This outreach activity continues to be very popular.
- The Math Contest held at UFV continues to be very popular. This year we had a round 130 students.
- We continue to have strong numbers in our courses.
- We continue to have waitlists on first year statistics service courses.
- UFV has implemented a rank and tenure system. Lecture faculty who had successfully completed a single three-year review were grand-parented in, with tenure, at the rank of associate professor. All faculties and departments are currently in the process of defining the process that will govern future promotions from assistant to associate professor and from associate to full professor. The ranks are not linked to salaries. The standards for rank and promotion from any department and faculty must be approved by the UFV Faculty Standards Committee.
- The numbers in our DAC (Data Analysis Certificate) continue to hold steady. One of the program entrance requirements is an appropriate statistics course. As we have had to run a statistics course in July/Aug for all intakes as there were students only missing the statistics entrance requirement, we have moved the statistics entrance requirement into the program (effective for the FALL 2016 intake). Students who have the required statistics course simply transfer the credit to the program. As the number of credits of the certificate is now 31, domestic students can now apply for student loans to take the certificate.
- The CIS (Computer Information Systems) department has moved from the Faculty of Science to the Faculty of Professional Studies.

UNIVERSITY OF NORTHERN BRITISH COLUMBIA – Erin Beveridge

University:

- University Undergraduate Enrolment decreased slightly from Fall 2012 to Fall 2013. Fall 2014 data not yet analyzed. Arts decreased more than Science.
- University Graduate Enrolment increasing slightly, particularly in Sciences.
- President Daniel Weeks started in Fall 2014.
- Vice-President (Academic) Bill Krane started May 2015.

Departmental:

- Honours Mathematics degree approved in 2013 but no students have completed.
- Education has asked that we look at MATH 190 as it is not meeting their needs.
- External Review will occur in Winter 2016.
- Lee Keener is retiring as of June 30, 2015.
- Seventeen students declared as Mathematics Majors.
- Nine students declared with a Minor in Mathematics.
- First Year Enrolment over 3 semesters -- Fall through Summer

	2010 – 2011	2011 – 2012	2012 – 2013	2013 – 2014	2014 – 2015
MATH 100 Calculus I	210	203	215	252	161
MATH 101 Calculus II	123	139	138	141	84
MATH 115 Precalculus	115	141	132	131	116
MATH 150 Finite Math	179	128	175	125	118
MATH 152 Calc Non-majors	205	224	239	199	152
MATH 190 Math Elementary Ed	31	15	16	15	22
STAT 240 Basic Statistics	162	197	169	192	188

UNIVERSITY OF VICTORIA – Gary MacGillivray

We have four items on which to report.

1. We have moved from a three course calculus sequence plus a differential equations course to a four course calculus sequence. The new course is numbered Math 204. The topics include vector calculus, multivariable Taylor series, Fourier series, and first and second order ordinary differential equations up to Laplace transforms. Some of the vector calculus content in 204 has been extracted from Math 200, Calculus of Several Variables, with the remaining content coming from Math 201, Introduction to Differential Equations, and Math 300, Advanced Calculus. No content was added to Math 200. Math 201 and 300 have been deleted, as has Math 205, Multivariable Calculus. Math 204 replaces Math 201 wherever it occurred in any program on campus. Besides content, a difference of note is that Math 204 carries Math 200 as a prerequisite — Math 201 had Math 101, Calculus II, as a prerequisite.

The change to Math 200 potentially affects articulation. Any course which previously transferred to UVic as Math 200 should continue to do so. However, it is possible that courses which transferred to the (now deleted) Math 205 may now transfer as Math 200.

There is no significant impact to the flexible pre-major. A student who comes to UVic with a differential equations class instead of a 204 equivalent should be able to continue in our programs. There may be some material missing if / when such a student takes a course like Calculus on Manifolds or Topology. We will treat this as an advising issue and handle it on a case by case basis.

2. Our combined programs Math - CSc and Stat - CSc have been revitalized. In the new arrangement, there is more flexibility for students to choose courses of interest. Also, the Stat - CSc combined program has somewhat of a data analysis flavour.

3. Some changes are under consideration for next year, including the possibility of an accelerated calculus sequence, and rearrangement of our second year so that fewer than the current 8 courses are required. A variety of options are under discussion. It unknown at this time what the outcome is likely to be.

4. We intend to run a pilot project this Fall where students with previous calculus experience will receive different instruction in Math 100, Calculus I. One goal is to provide a more engaging environment by taking advantage of their previous exposure to the material. The overriding goal is assuring that the students are properly prepared to take Math 101, Calculus II.

VANCOUVER COMMUNITY COLLEGE – Gabriela Kakushkin

VCC offers 1st year transfer math and statistics courses Calculus I, II, Precalculus and Introduction to Statistics. Two new courses have been developed: Applied Linear Algebra (MATH 1221) and Discrete Mathematics (MATH 1121), as core courses in the 1st year Engineering and Computing Science and Software Systems Certificate programs. Both certificates provide the option to VCC students to complete their 1st year courses at VCC and then transfer by either guaranteed admission or competitive admission to SFU and competitive admission to UBC. In Fall 2015 we will officially run the

certificate programs and anticipate increased enrolment in our Calculus science stream courses with more sections being offered. Introduction to Statistics has high enrolment with students seeking entrance to Health Science programs.

VANCOUVER ISLAND UNIVERSITY – David Bigelow

The Faculty of Science and Technology has hired Don Noakes, the TRU Math Department Chair, as its new Dean.

The department has been experimenting with running upper level courses on a three year rotation in an attempt to offer greater numbers of courses. Upper level numbers have been down a bit from previous years but they seem to be heading towards their traditional levels next year.

The department has been offering a Minor degree for about ten years and the Major concept has been approved by both Faculty Council and the VP Academic. We are encouraged by recent developments.

We are opening more seats for dual credit students. However, we had planned to offer a section of Math 121 at the Cowichan campus this spring and, despite having full enrollment, the course fell through. We are still hopeful that such a course will be possible in the future.

We offered a section of Math 151 at The Chemainus Native College as part of a Business Fundamentals Certificate for Aboriginal students.

The Powell River campus is hoping to offer a section of Math 131 next year. This would be the first time in more than 25 years that a Math course has been offered at the PR campus.

We will be offering Math 254, Calculus based Statistics, for the first time next year.

We are planning to develop an online, dual credit, Math 121 course for international students. Although there are many issues to be dealt with, we hope to have this course up and running in January, 2017.

Psychology is the latest in a long list of programs to remove or weaken their Mathematics requirements. Students will no longer need to take a first year Math course. Instead, Math 11 will be sufficient.

YUKON COLLEGE – Tim Topper

A status quo year at Yukon College. Our university-transfer mathematics offerings continue to be single sections of: Math 100 Single Variable Calculus I (Also offered online as a dual-credit course for high school students.)

Math 101 Single Variable Calculus II

Math 105 Introductory Statistics

Math 120 Mathematics for the Life Sciences

MATY 101 Introductory Finite Math I (for students in the Yukon Native Teacher Education Program. MATY 101 articulates with U Regina which grants the program degree.)

Math 130 Finite Mathematics was not offered. Math 120 seems to have taken its niche.

Staffing: Tim Topper will be retiring in June 2015.

8. BUSINESS ARISING FROM THE MINUTES OF THE 92ND MEETING

8.1 Mathematics and Statistics articulation in Alberta. Report from the Chair of the ACAT Mathematics and Statistical Sciences Articulation Committee, David McNeilly (University of Alberta).

David expressed his gratitude to BCcupms for providing examples of agreements and reports which have been helpful to ACAT. He also thanked Jim Bailey for attending meetings which has also been beneficial.

8.1 a Articulation of Mathematics and Statistics Courses between Alberta and British Columbia: progress report - Jim Bailey.

The information for articulating Calculus I and II based on the Core Calculus Agreement (CCA) is almost complete. Most Alberta institutions are happy to accept students from British Columbia who have taken courses which satisfy the CCA. Alberta to British Columbia is more of a problem because Science Calculus I and II often do not contain enough series. Some institutions have brought their courses in line with the CCA; in other cases it is the Engineering calculus which will transfer to BC. Results to date can be seen at <http://jasleobailey.wix.com/ab-bc-articulation>.

Motion: (moved by Leo Neufeld and seconded by David Bigelow)

That the AB-BC Calculus I and II grid as proposed by Jim Bailey and David McNeilly be approved for posting on ACAT and BCCAT.

Carried unanimously.

(Note: 8.1b,8.1c,8.1d, 8.2, 8.3, 8.4 were moved to Wednesday)

8.1.b Possible joint meeting in 2017 - Jim Bailey.

About a year ago Jim Bailey put in an application to BIRS for a week at the Banff International Research Station which would consist of an meeting of the Mathematics Contest (Monday), joint ACAT--BCCAT articulation of Mathematics and Statistics (Tuesday and Wednesday), and a joint meeting of the Alberta Mathematics Dialogue and Sharing Mathematics (Thursday and Friday). About the same time there was a call from BIRS for proposals for 2016; Jim will resubmit the proposal in mid to late May. The projected attendance for the articulation meeting is 20 (AB) and 45 (BC); for the AMD and SM it is 90 (AB) and 35 (BC). There may be a problem with the size of their lecture theatre (holds 50) and their accommodations. Information about BIRS can be found at <http://www.birs.ca/>.

8.1.c Possible Joint Core Calculus Agreement between Alberta and British Columbia

Jim reported that members of ACAT are interested in a similar agreement to our core calculus agreement. Jim offered to help facilitate this along with David Leeming and Leo Neufeld. It would be difficult for Alberta institutions to be included in our agreement as the differences between postsecondary institutions in the province make it difficult to have a core set of agreed upon offerings. In particular, the presence of sequences and series is an issue as institutions in Alberta don't all teach that topic in first year calculus.

8.1.d Core Linear Algebra and Core Introductory Statistics Agreements: is it time to reconsider these? Are joint agreements with Alberta possible?

In the follow-up survey to Core Calculus it was indicated that there was some interest in developing a similar agreement for Linear Algebra. Jim Bailey will produce a list of institutions which offer Linear Algebra for use as a starting point. It appears that there is no interest in a core first year statistics.

8.2 Review of the Mathematics for Elementary Teachers Report - Nora Franzova.

Nora reported the following:

BCCUPMS Subcommittee on Mathematics For Elementary School Teachers Courses prepared its report in 2008 and the report was approved at the 88th BCCUPMS Meeting on May 18th, 2010.

This report became a guideline for designing, teaching and evaluating math courses for Elementary School Teachers in BC. After 5 years, the usual review process was needed. Faculty of BC postsecondary institutions that teach such courses were asked to provide their course outlines and the following table includes a summary of several key points that were examined in comparing these course outlines. These were Prerequisites, Topics covered, Number of credits, Number of hours in class per week, the Weight of the final exam. Nora received 7 course outlines and searched several others online.

To summarize, there is a very good consistency in:

- Prerequisites - Precalc (Principles) Math11 with a C. (extreme cases are Math 11 only recommended, and Principles/Precal 11 with a B).
- Topics covered - problem solving, patterns, number systems, fractions, decimals, geometry
- Final exam weight - 30-35%

Approved Teacher Education Programs (PDP) in BC

- Simon Fraser University
- Trinity Western University
- Thompson Rivers University
- University of the Fraser Valley
- University of British Columbia
- University of Northern British Columbia
- University of Victoria
- University of British Columbia - Okanagan
- Vancouver Island University

Most PDP programs require the students to take only one Math course with UVic being an exception. Specific requirements can be found in the respective links above, but for example for SFU it states that the Math requirement is MATH 190 (Principles of Mathematics for Teachers) or equivalent. UBC provides a complete table in its calendar.

Institution	Course name	Prerequisite	Book	Credits/Hours per week	Final Exam	Topics
Camosun College	Math112	Principles/Precalc/Fom 11, or Applications on Math12 or some college courses	Finite Math, by S.T. Tan	4/5	37.50%	Problem Solving, Logic, Sets, Patterns, Conics, Probability, Curves
Camosun College	Math113	Principles/Precalc/Fom 11 or Applications on Math12 or some college courses	College made materials	4/5	30%	Numeration Systems, whole number operations, sequences, Symmetry, Tessellations, area of plane figures, Triangle congruency
Capilano University	Math 190	Precalc/Principles 11, FOM/Appl 11, FOM/Appl 12 with a C or better, diagnostic test and in house courses	Problem Solving Approach to Math for Elem School Teachers, by Billstein, Libeskind and Lott	3/4	35%	Problem Solving, Whole number operations, Divisibility, Rational numbers, Geometry and Measurement
College of New Caledonia	Math190					
Douglas College	Math1191	Principles, Precalc 11 with a C, FOM 11 or FOM 12 with a C	Modern Mathematics for Elementary Education, by Wheeler and Wheeler	4/6	30%	Patterns, Polya, Venn diagrams, models for addition, subtraction, multiplication, division, GCM, LCM, fractions, converting units, geometric constructions
Kwantlen Polytechnic University	Math1190	Precalc12, Principles 12 with C+, or C if they take a placement test, Precalc 11 with a B, FOM11 with a B (MANY OTHER COMBINATIONS)		4		Students will study the theory and applications of arithmetic, geometry and data analysis (statistics).
Langara College	Math 1190	Principles 11 or Precalc11 or Applic and FOM12 with a C, Applications of or FOM 12 with C-	Mathematics for Elementary Teachers by Bennett, Burton & Nelson	3/4	30%	Problem Solving, Patterns, numeration systems, Different bases, Add/Sub, Multiplication/Division, Fractions, Decimals, Proportions, Geometry
Okanagan College	Math 160	ANY Math11 (incl. Apprentice and Workplace)				
QUEST	Mat3301		Sowder, Sowder	1/ Total=51		Patterns, numbers, problem solving and mathematical investigations, reasoning about quantities, Numeration systems, bases, Number theory, Whole number operations, Fractions and decimals, ratio, proportion, rates, percentages, Measurement, 2D and 3D shapes Symmetry and transformations Nets of polyhedral, Area and volume Optional topics could include counting and choices, probability, integers
Simon Fraser University	Math190	Principals of Math11, FOM 11 with a B				
Thompson Rivers University OL	Math1901	FOM 11, Precalc 11 - strongly recommended				Numbers, fraction, addition subtraction, multiplication, proportionality
Thompson Rivers	Math1909-SFU Math190	Principals of Math11, FOM 11 with a B				
Trinity Western University	Math190	Principles or FOM 11				patterns, numbers, number systems, logical reasoning, elementary number theory, counting probability
University of British Columbia (Vancouver)	Math 230	Principles Math11				
University of British Columbia (Vancouver):	Math 335	Principles Math11				Fun and games, number contemplations, geometric gems, contortions of space, chaos and fractals
University of Northern British Columbia	Math190	Principles of Math11 or in house courses	Math for Elementary Teachers by Musser, Burger and Peterson		30%	Numbers, number systems, patterns, relations, shapes and space, statistics and probability. Problem solving

8.3 Collaborative Offering of Under-enrolled Mathematics and Science Courses (NIC, CotR, NWCC?). Jim Bailey.
 NIC and CotR continue to offer the two versions of Engineering Statics and Dynamics required by UVic and UBC. The first half of the two courses are identical and are taught face-to-face. We then switch to teleconference at our spring breaks: NIC teaches UVic's PHYS 141 and CotR teaches UBC's PHYS 170. All written work (assignments, midterms, and the final exam) are handled locally. It has been working very well and allows us to attract student who would

otherwise go elsewhere. Dennis Lightfoot (NIC) has also developed an online version of Engineering Linear Algebra which he intends to offer next fall.

8.4 Webmaster Report.

See 4.6: Stephen Benecke volunteered to take over the role of webmaster for the BCcupms website in place of Ian Affleck.

9. **PUBLISHERS' REPRESENTATIVES:** the latest developments related to Mathematics textbooks Representatives from Wiley, Nelson, MacMillan/WH Freeman and Pearson gave presentations.

The Tuesday Session of the BCcupms adjourned at 4:35 p.m.

BCcupms and Secondary School Teachers Session

10. INTRODUCTIONS AND OPENING REMARKS

The committee welcomed Clarice Tyce, Woodlands Secondary School, Nanaimo; Zinda Fitzgerald, Aspengrove School, Lantzville; Andrea Wyness, Aspengrove School, Lantzville; Kim Murcheson, Mark R. Isfeld Secondary, Comox Valley Secondary; Kathy Jacobsen, Dover Bay Secondary, Nanaimo; Carol Funk, Nanaimo District Secondary School to our meeting.

11. REPORTS

10.1 BC Secondary Schools Math Contest—Clint Lee (see attached report, page 23)

The 2016 preliminary round will be held on April 6 and the final round will be held on May 6.

10.2 BCAMT—Ron Coleborn

Ron shared that the BCAMT organized a meeting with teachers to provide input for the new high school curriculum, including Precalculus and Calculus, and it would be beneficial to have exchanges between high school teachers and post-secondary instructors. It was suggested that if high school teachers want to know more about what post-secondary math courses require, they can look at the proficiency report from 1999 available on the BCcupms website.

12. Project based Learning in Secondary Mathematics – Kim Murcheson

Kim requested information about what kind of project based learning, if any, occurs in post-secondary math courses, i.e. projects. Reports were that there are not a lot of project based assessments but UNBC is contemplating projects jointly with other science courses such as physics, biology and chemistry.

13. What math skills are weak/strong .. How well are secondary students prepared for post-secondary math courses – Kim Murcheson; are there any skills that universities would like to see improved? Kathy Jakobsen

Kathy reported that one of their primary goals is to prepare students for university. She reported that while certain skills are good, some concepts are compartmentalized and don't carry through to subsequent courses and students need to build on what was learned before. Further discussion included what post-secondary institutions have in place to help students who are clearly struggling. For example, Justin Gray reported that SFU gives a diagnostic test at the beginning of Calculus I and recommends students who are weak take precalculus instead and they also report struggling students to advising.

14. General discussion: further topics to be suggested by the teachers

Admission requirements – Teachers asked what specific high school courses are required for admission to post-secondary programs. Jim Bailey described the process of admission to university, admission to faculty, admission to program and then into individual classes and that specific requirements vary.

15. Adjourn to reception.

The BCcupms and Secondary School Teachers' Session adjourned at 5:30 p.m.

WEDNESDAY, MAY 13, 2015

Plenary Session

16. OPENING REMARKS

16.1 Introduction of representatives

16.2 Attendance lists Nora Franzova circulated the attendance lists.

16.3 Announcements from the host: Glen Pugh announced the time and location for the Greek dinner.

(Note: items carried over from Tuesday: 8.1b, 8.1c, 8.1d, 8.2, 8.3, 8.4)

17. REPORTS

17.1 PIMS—David Leeming, PIMS Education Associates Coordinator (see attached report page 25-26)
David reported that PIMS received a renewal of NSRC funding which included an increase. PIMS will now have funding until 2019. The former director has moved on to Mitacs and Martin Barlow is the new director. David reported that there are ten education associate members in BC and four in Alberta. David shared many of the outreach activities the education associate members are involved in.

17.2 ABE—Costa Karavas, Vancouver Community College (see attached report page 27)

17.3 Math Challengers—Leo Neufeld (see attached report page 28)

17.4 Changing the Culture—Susan Milner
Susan reported that the Changing the Culture conference was held on Friday May 8 at SFU. The conference included panels and workshops and participants were drawn from educators from Kindergarten through post-secondary.

Parallel Sessions

Mathematics and Statistics Subcommittee Sessions (held concurrently)

18. MATHEMATICS SESSION (Chaired by Jim Bailey)

18.1 Report from the Calculus Readiness Test Subcommittee—Justin Gray

Justin reminded us that the goal of shared calculus readiness test is to produce a diagnostic tool that can predict success in first semester calculus. The questions developed were initially based test on the BCcupms math proficiencies report. By last year, Justin had coded 92 test items using LON-CAPA, many submitted by Tim Topper, and invited instructors to test the questions on their students in open-ended format to generate “distractors” for the multiple choice version. College of the Rockies, Douglas College, Langara College and the University of Northern BC all volunteered to have their students test the questions. Justin has narrowed the test down to thirty multiple choice questions that now need to be tested on students in first semester calculus to determine if the test is a good predictor of success. Several institutions volunteered to test the questions this Fall on their students. Justin will report the results and progress of the test at our next meeting.

18.1a Do we want to share the Calculus Readiness Test with Alberta Institutions? Athabasca University, Red Deer College, Mount Royal University, and SAIT are interested.

There were no objections to sharing the test with Alberta institutions. The only potential problem would be if SFU had to host a large number of students on their LON-CAPA server but in this case, a PDF version could be provided and individual institutions could score students on their own software.

18.1.b Do we want to share the Calculus Readiness Test with secondary school teachers?

Melissa Horner expressed that teachers would welcome any information about what students need to learn to be successful in calculus. Concern was expressed, including from Melissa, about the security of the test if it were widely shared. An alternative would be to share sample questions via a website. Another suggestion that could provide even more information to secondary school teachers would be to provide samples of final exams from post-secondary precalculus courses. Jim Bailey suggested that Justin speak at the BCAMT conference which is being held in October in Whistler.

18.2 Calculus Challenge Exam - Justin Gray.

Justin reported that the Calculus Challenge Exam is an exam that takes place in June for students who have taken a course in high school in differential calculus to challenge and receive credit for Calculus I. The fee for taking the exam is \$100. Several institutions in BC accept the challenge exam result as credit for Calculus I including UBC, SFU and UNBC. SFU and UBC take turns hosting it with UBC scheduled to host it in 2015. Annually, approximately 75-100 students take the exam and the topics are based on the Calculus 12 curriculum with the difficulty level comparable with Calculus I. The challenge exam is advertised over the BCAMT listserv. Susan Milner suggested that this item could be moved in the future to the high school teachers' session as it may be of interest to them.

18.3 Core Calculus Agreement for Life Sciences Calculus - Michael Nyenhuis

Michael reported that there are large differences in how institutions approach Calculus for the Life Sciences and therefore it is not possible to develop a core agreement for this stream of calculus. The main differences are the treatments of differential equations and of sequences and series.

18.4 STEM as an Acronym/Buzzword (Added by Veda Roodal Persad)

Veda wanted to know how institutions are using this acronym. Many institutions are using it as it is being heavily used in the media and especially in the US.

STATISTICS SESSION (please see the complete Minutes of the Statistics Session on pages 29-32)

Stats 18.1. Approval of Agenda

Stats 18.2. Approval of Minutes of the Statistics Subcommittee Session at 92nd Meeting

Stats 18.3. Matters Arising from the Minutes

Stats 18.4. Institutional Reports

Stats 18.5. Any other business

Stats 18.6. Motion to adjourn

Plenary Session

19. Highlights from the parallel sessions (details will appear in the minutes.)

Mathematics Session

Nora Franzova summarised the discussions of the Mathematics Session.

Statistics Subcommittee Session

Bruce Dunham summarised the discussions of the Statistics Session

- 20. Keynote Speaker** - Dr. Jon Schnute (retired mathematician and fish scientist from the Pacific Biological Station in Nanaimo). Dr. Jon Schnute gave a presentation entitled “Mathematics – A Tool for Angels or Demons?” The focus of the talk was about how stories can play a valuable role in capturing the interest of students. Many interesting books and historical incidents in economics and ecology were presented, each presenting itself as angel, demon or both, depending on your point of view. Both poignant and humorous, the talk provided many interesting examples and ideas for presenting data in the classroom.

21. NEW BUSINESS

21.1 Retirements and Retrenchment

The question presented to the group was “How many department members do you expect to retire over the next several years and how many will be replaced?” In general, the answer was yes but sometimes with a lesser (part-time, or casual) appointment.

21.2 Open source textbooks: who is using them? Jim Bailey

Jim reported that he used an open source text for calculus but found exercises too algorithmic and where sections were missing he had to write his own notes. At the end of the course, students’ exam results were in the typical range so perhaps the open source textbook, supplemented, is sufficient. Nora Franzova reported that she uses an open source algebra text and is satisfied with it but not all instructors are of the same opinion. The advantages of open source textbooks are their low/free costs and the ability to edit them so that the end result is a highly customized book. Wayne Nagata had reported earlier in the meeting that UBC is moving to an open source textbook for first year calculus.

21.3 Publishers’ software: Who is using it? What useful features do they have? Are they compulsory or optional? What are your opinions?

Due to time constraints, this item was omitted from the discussions.

21.3 a Pearson: MyMathLab, MathXL, and Mastering(Engineering, Physics)

21.3 b WebAssign (used by Nelson)

21.3 c LONCAPA (free, used by SFU)

21.3 d WebWork (free, used by Freeman, UBC)

21.3 e MyOpenMath (free)

21.4 Our Keynote Speaker: should we continue this tradition? Jim Bailey

Many members reported that they enjoy the keynote speaker. Susan Milner suggested that we leave it for the local hosts and the chair to decide on whether a keynote speaker will be included year to year.

21.4 Academic Dishonesty

This item was omitted but will be put on the agenda for the next meeting.

22. REPORTS

22.1 Report from the Nominating Committee

The nominating committee reported that: Jane Butterfield accepted the nomination as secretary and Deanna Baxter accepted the nomination of Vice Chair. Call for nominations: three calls for each and nominations were accepted as recorded above.

22.2 Announcement of the person who volunteered to organize our Sharing Mathematics Conference.

See also 4.5. Gary MacGivally and Jane Butterfield (UVic) volunteered to organize the Sharing Mathematics Conference to be held at Columbia College in May 2016.

20. COMMITTEE BUSINESS

20.1 Theme for our 94th Meeting – Justin Gray suggested flipped classes. Members can email Jim Bailey with any other suggestions.

19.2 Date and Location of the 94th Meeting - May 17-18, 2016 at Columbia College (Vancouver, BC)

19.3 Proposed dates for future BCcupms meetings

Year	Dates	Host
2016	May 17-19	Columbia College
2017	May 16-18	BIRS (Joint AB-BC Meeting)
2018	May 15-17	
2019	May 14-16	
2020	May 12-14	

19.4 List Updates: E-mail, Member Contacts & Listservs

Members were asked to ensure that addresses on the circulated email list are correct and that names of representatives on the website are up-to-date. Contact Stephen Benecke at stephen.benecke@gmail.com for web information updates. The names of any new department chairs should be sent to Stephen as well. Gary MacGillivray can be contacted for changes to the listserv. The Statistics listserv and the MFEE listserv are both maintained by Susan Chen.

Send corrected info to both Ian Affleck and Stephen Benecke during the transition, including final exam contact information.

20. Adjournment of the Wednesday session

The Wednesday Session of the 93rd meeting of the BCcupms adjourned at 4:30 p.m.

Many, many thanks to Glen Pugh and the Mathematics Department at Vancouver Island University for all their excellent work in hosting us for this meeting.

List of Committee Members Present

Plenary Session – Tuesday, May 12, 2015 (a.m/p.m); Secondary Teachers Session – Tuesday May 12, 2015; Plenary Session – Wednesday, May 12, 2015 (a.m.); Concurrent Math/Stats – Wednesday, May 12, 2015 (a.m.); Plenary Session – Wednesday May 12, 2015 (p.m.)

Name	Institution	TUES	TEACHER	WED	MATH	STAT
Jim Bailey	College of the Rockies	X	X	X	X	
George Ballinger	Camosun College	X	X	X	X	
Deanna Baxter	Capilano University	X	X	X	X	
Gera Belchev	Coquitlam College	X	X	X	X	
Stephen Benecke	Trinity Western University	X			X	
Erin Beveridge	University of Northern British Columbia	X			X	
David Bigelow	Vancouver Island University	a.m.	X	X	X	
Laura Billing	British Columbia Institute of Technology	X				
Wayne Broughton	University of British Columbia (Okanagan)			X	X	
Jane Butterfield	University of Victoria	X	X	X	X	
Susan Chen	Camosun College	X	X	X		X
Ron Coleborn	BCAMT		X			
Kevin Craib	Langara College	X	X	X		X
Jason Diemer	North Island College	X	X	X	X	
Bruce Dunham	University of British Columbia	X	X	X		X
Suzanne Feldberg	Thompson Rivers University	X	X	X	X	
John FitzGibbon	BCCAT	X	X			
Nora Franzova	Langara College	X	X	X	X	
Himadri Ganguli	Columbia College	X	X	X	X	
Justin Gray	Simon Fraser University	X	X	X	X	
Doug Henderson	Selkirk College	X	X	X	X	
Melissa Horner	Ministry of Education	X	X	a.m.	X	
Gabriela Kakushkin	Vancouver Community College	X	X	X	X	
Joyce Kwan	Acsenda School of Management	X	X	X		X
Lisa Lajeunesse	Capilano University					
Clint Lee	Okanagan College	p.m.	X			
David Leeming	Pacific Institute for Mathematical Sciences	X	X	X	X	
Mary Lesperance	University of Victoria		X	a.m.		
Peter Liljedahl	Simon Fraser University	X	X			
Jason Loeppky	University of British Columbia (Okanagan)	X	X	X		
Gary MacGillivray	University of Victoria	X	X	X	X	
Andrew McConnell	British Columbia Institute of Technology			X	X	
David McNeilly	ACAT/University of Alberta		X	X	X	
Alan Meichsner	Douglas College	X	X	X		X
Susan Milner	University of the Fraser Valley	X	X	X	X	
Fred Mistry	Northwest Community College	X	X	X	X	
Wayne Nagata	University of British Columbia (Vancouver)	X				
Leo Neufeld	Math Challengers	X	X	X	X	
Michael Nyenhuis	Kwantlen Polytechnic University	X	X	X	X	
Susan Oesterle	Douglas College	X	X	X	X	
Paul Ottaway	Capilano University	X	X	X		X
Glen Pugh	Vancouver Island University	X	X	X		
Shane Rollans	Thompson Rivers University	X	X	X		
Veda Roodal Persad	Thompson Rivers University - Open Learning	X	X	X	X	
Jason Schaad	Okanagan College	X	X	a.m.		
Wesley Snider	Douglas College	X	X	X	X	
Krishna Subedi	Alexander College	X				
Richard Taylor	Thompson Rivers University	X	X	a.m.	X	
Tim Topper	Yukon College	X	X	X	X	
Tracy Wall	College of New Caledonia	X	X	X	X	

Sharing Mathematics 2015
May 14, Vancouver Island University
Attendance

1	Susan Milner	UFV
2	Jim Bailey	CofR
3	Rick Brewster	TRU
4	Deanna Baxter	CapU
5	Paul Ottaway	CapU
6	Suzanne Feldberg	TRU
7	Nora Franzova	Langara
8	Shane Rollans	TRU
9	Veda Roodal Persad	TRU-OL/Langara
10	Michael Nyenhuis	KPU
11	Lin Hammill*	KPU
12	Jane Butterfield	UVic
13	Joyce Kwan	Acsenda
14	Gary MacGillivray	UVic
15	Susan Oesterle	Douglas
16	Ian Bailey	VIU
17	Alan Meichsner	Douglas
18	Glen Pugh	VIU
19	Doug Henderson	Selkirk
20	Wesley Snider	Douglas
21	Erin Beveridge	UNBC
22	Chirs Shanks	VIU
23	Eric Agyekum*	VIU
24	Phil Dauk	VIU
25	Dave Bigelow*	VIU
26	Lisa Lajeunesse*	CapU

*presenter

BC Secondary School Mathematics Contest, 2015 Report to the BCCUPM

On May 1, 2015 the Final Round of the BC Secondary School Mathematics Contest was written at 10 provincial colleges and universities. Students who had performed well on an earlier Preliminary Round held within their own high schools were invited (together with a teacher sponsor) to attend the Final Round and spend a day at the local post-secondary institution with several activities involved.

Participating institutions are:

Capilano University	(CapU)
College of New Caledonia/University of Northern BC	(CNC/UNBC)
College of the Rockies	(CotR)
Langara College	(Lang)
North Island College	(NIC)
Northwest Community College	(NWCC)
Okanagan College/UBC Okanagan	(OC/UBCO)
Thompson Rivers University	(TRU)
Vancouver Island University	(VIU)
University of the Fraser Valley	(UFV)

The table below gives a summary of the number of students and the top scores (out of a possible 100) on the Final Round at each institution that did run the Final Round.

Institution	Final Round		Top Three Scores		Averages	
	Juniors	Seniors	Junior	Senior	Junior	Senior
CapU	16	15	95, 95, 79 (77)	100, 100, 96 (91)	61.9	66.9
CNC/UNBC	10	16	20, 13, 13	33, 32, 30	9.7	16.6
CotR	11	7	54, 52, 48	52, 46, 45	36.5	37.7
Lang	28	17	97, 95, 93	95, 89, 79	63.4	49.6
NIC	20	12	80, 75, 70	75, 69, 63	41.8	50.2
NWCC	12	3	59, 43, 38	35, 32, 18	29	28.3
OC/UBCO	56	29	83, 75, 71	73, 67, 59	49.3	37.0
TRU	30	27	63, 56, 55, 55	68, 54, 52	37.2	31.6
VIU	46	41	72, 71, 68	84.5, 82.5, 59	39.4	29.7
UFV	70	54	95, 87, 85	99.5, 95, 90	47.8	44.7
TOTAL	299	250				

Approximately 1300 Juniors and 750 Seniors throughout the province wrote the Preliminary Round this year. The top reported Junior and Senior Preliminary scores were both 60 out of 60, with averages between 20 and 30. Not all schools report Preliminary Round scores or participation numbers, so these are not necessarily an accurate reflection of the level of participation in the Preliminary Round. A total of 549 students, from the eight institutions reporting, participated in the Final Round this year.

The Preliminary Round, scheduled for April 1 in 2015, is handled the same way at all institutions. Note that there is some flexibility in the Preliminary Round date, as Spring Break in some districts conflicts with the normally scheduled date. The guiding principle changing the Preliminary Round date is that it should not be administered before the officially scheduled date, and that no prizes be awarded based on Preliminary Round scores in the case of the Preliminary Round being written after the official date. The Preliminary Round contest papers are made available to participating schools, either by mail or by electronic means. The contest is administered and marked at the schools and the results, including the names of the Final Round participants, are transmitted to the hosting institution. The Final Round does have variations. At all institutions the Final Round contest was administered on the morning of May 1, with some type of activity provided for the sponsor teachers, and, after the contest is completed, lunch is provided for all participants. After lunch the activities vary. Some institutions have talks for the participating students and teachers, others combine talks with other activities, such as a math relay or scavenger hunts. During the time that the afternoon activities are taking place, the contests are marked, and later in the afternoon prizes awarded. The prizes vary among institutions. Some institutions give book prizes to all or selected participants; some institutions give cash prizes and/or scholarships to winners; many give T-shirts to all participants.

Two institutions have instituted the practice of separating junior contestants, specifically grade 8, to allow them to work on certain portions of the contest in teams. Having done this over the last few years at OC has generated a significant level of interest among local middle schools, resulting in a noticeable increase in participation among grade 8 students.

Thanks should go to those who have organized the Contest at their individual institutions and encouraged their local schools to participate in the Contest. First there are the primary organizers at each of the Colleges: Nora Franzova at Langara College; Sherrie Wang at North Island College; Erfan S. Zahra'i at Northwest Community College; Clint Lee, Leslie Corbett and Satoshi Tomoda at Okanagan University College and Wayne Broughton at UBC Okanagan; Nicholas Buck (CNC); Suzanne Freiberg and Shane Rollans at Thompson Rivers University; Ian Affleck at University of the Fraser Valley; Marsha Anderson at Capilano University; and Patrick Ng at Vancouver Island University College. Although these are the primary organizers at each institution, it goes without saying that they do NOT do all the work required to make this contest a success. Indeed, they have indicated that their entire departments are involved with hosting the contest. Special thanks should go to John Grant McLoughlin, who, as a professor in Mathematics Education at the University of New Brunswick, continues his involvement with our contest even though he is at other end of the country, and to Mike Szesztopalaw, a past contestant from Vernon, who is now a PhD student in mathematics at Waterloo University.

Furthermore, the people who submitted problems and met at Kwantlen Polytechnic University last May to put together the initial drafts of the contest papers and reviewed them as they developed are: Ian Affleck (UFV), Jim Bailey (CotR), Clint Lee (OC), Nora Franzova (Lang), Lisa Lajeunesse (CapU), John Grant McLoughlin (UNB), Mona Izumi (NWCC), Annie Marquise (Doug), and Wayne Broughton (UBCO). Solutions were prepared and typeset by Nicholas Buck (CNC), Jim Bailey (COTR), Satoshi Tomoda (OC), and Clint Lee (OC). The final compilation and typesetting of the contest papers and solutions was done by Clint Lee, who is also responsible for distributing the contest materials to all of the participating post-secondary institutions. He is also ultimately responsible for any errors that may have appeared in the contest papers.

Funding of the province wide activities associated with the BCSSMC, in particular travel of speakers from one institution to the other for Final Round activities and by the BCSSMC Provincial Coordinator, currently Clint Lee, to the BCCUPMS meeting for Problem Preparation sessions, has been generously provided by the Pacific Institute for the Mathematical Sciences, PIMS.

This report, together with information on winners from the individual institutions, will be posted on the BCSSMC web site at people.okanagan.bc.ca/clee/BCSSMC/2015/MathContestBCCUPMReport_2015.htm.

My apologies to anyone whose name may have been inadvertently left out.

For those planning for next year, the dates I am suggesting for the 2016 contest are:

Preliminary Round:	Wednesday, March 30 or April 6, 2016
Final Round:	Friday, April 30 or May 6, 2016

Respectfully submitted to the BCCUPMS on May 12, 2015 by

Clint Lee
Okanagan College, Vernon

**PIMS – Report to the BCcupms Meetings, May 11-12, 2015
Vancouver Island University, Nanaimo, BC**

PIMS Update

The Pacific Institute for the Mathematical Sciences (PIMS) received a renewal on its funding from NSERC for the period 2014 to 2019.

In spite of numerous cuts in federal funding, the \$6.25 million annual allocation represents almost a 14% lift from the previous five year cycle.

Dr. Alejandro Adem, PIMS Director since 2008, recently resigned to take the position of Chief Executive Officer and Scientific Director of MITACS. He remains a Professor of Mathematics at UBC. The interim Director of PIMS is Martin Barlow – also a Professor of Mathematics at UBC. Alejandro was a great supporter of PIMS initiatives in math outreach and is responsible for the current model for the PIMS Education Associates. Currently, there are ten Associates in BC and four in Alberta.

BC PIMS Education Associates:

Camosun College	Capilano University
College of the Rockies	Douglas College
Langara College	Okanagan College
Selkirk College	Thompson Rivers University
University of the Fraser Valley	Vancouver Island University

Reports on Math Outreach from the BC PIMS Education Associates

Camosun College:

Camosun hosted the BC Math Challengers event on February 13 at their Interurban Campus.

The competition is sponsored by the APEGBC. This year there were twenty teams of four from grades eight and nine participating in the half-day event. The competition consists of two rounds of individual question papers followed by a team round. During the refreshment break, scores are tabulated and the top ten from each grade go head-to-head in the Countdown Round. Trophies go to the top three and each participant gets a medal – to be named the PIMS Medal.

One Camosun faculty member has created from wood several amazing ‘Math Toys’. [These were demonstrated and then displayed at the Meeting by Susan Chen]. These ‘Math Toys’ have also been loaned to a local middle school.

Other outreach activities by Camosun include hosting the BC Secondary Schools Math Contest. They also give ‘kite’ workshops in some elementary and middle schools. These are given by the Elementary Education students.

Capilano University

Capilano hosted the BC Secondary School Math Contest (grades 8-12). They held a SNAP Math Fair in Nov. 2014 for local grade 4-5 students as part of their Math 190 course – Math For Elementary Teachers. In Feb. 2015, they put on Math Fair style games for visitors who found the Math & Stat Department as part of the Arts and Science Open House for potential applicants. For refreshment, mini pies (tarts) were served in anticipation of Pi day. In March 2015, the Math and Stat Department (jointly with PIMS) put on a Math Mania event to which grade 4 and 5 students were invited to participate.

Also in March 2015 – March 14 to be precise – Math & Stat hosted Pi Day in the Math Learning Centre. Pi Day was celebrated by playing games, serving pie and having a digits of PI contest.

College of the Rockies

COTR hosted the BC Secondary School Math Contest.

Douglas College (verbatim from Natasha Davidson)

This year we put on an event at Meadowbrook Elementary and it was a great success, with children, volunteers and parents/guardians we had just under 100 and everyone had a great time. Most of our volunteers were enrolled in the Math for Teachers course at Douglas and this experience had a big impact on them - the enthusiasm of the children as they engaged in meaningful mathematical activities really impressed upon them the potential for learning and excitement with a well thought out hands on activity. Their own enthusiasm reinforced for me the importance of having people considering the teaching profession participate in these activities.

Langara College

Langara put on two Math Fair projects at Elementary Schools. They visited Norma Rose Point in the UBC area (Nov. 17th) and General Currie in Richmond (Nov. 21st).

They also visited the Vancouver Hebrew School at end of March. Langara hosted all the sittings of American Math Contest (AMC10/12, A and B) and AIME and had about 70 students coming to the College. Once again Langara hosted the BC Secondary School Math Contest.

Okanagan College

Okanagan ran SNAP Math Fairs at the Kelowna, Vernon and Penticton campuses this year. The events have been successful and will be continued. At all three campuses, students from OC MATH 160 – Math for Elementary School Teachers – are involved. They continue to host the Math Challengers (BCMC) event for the Okanagan Region. Satoshi Tomoda is the principal organizer. (BCMC is described in the Camosun College report).

Okanagan continues to partner with UBCO for the BC Secondary School Mathematics Contest. We are sorry to be losing Clint Lee's 25 years of experience as he retires in a couple of months.

Thompson Rivers University

The Math & Stat hosted a puzzles and games sessions at the TRU Family Night of Science in Feb. 2015. In March 2015 they hosted a Combinatorial Games session as part of the TRU International Days festivities.

In April 2015, TRU hosted the Regional Science Fair and a Math Mania event with Melania Alvarez, Education Coordinator, PIMS UBC.

In May 2015, TRU hosted the District Math Challenge (an SD #73 event) on campus, which included a variety of math activities presented by Math & Stats faculty members. They also hosted the final round of the BC High Schools Math Contest.

The Department also made a Class visit to South Sahali Elementary School Grade 1 (French Immersion) for a math puzzles and games session.

University of the Fraser Valley

UFV will hold four Math Mania events this year (dates and schools below).

Oct 1, 2014 at Mennonite Education Institute Middle School

January 28, 2015 at Yarrow Community School.

May 6, 2015 at the Mennonite Education Institute Elementary School in Abbotsford.

June 3, 2015 at Sardis Elementary in Chilliwack.

UFV usually gets 18-24 volunteers out for an event. These volunteers include students, former students, faculty, retired faculty, and family members of students and faculty.

On June 3 is Math Mania event number 20. One of the student volunteers, now in the Teacher Education Programme for high school, will be joining us for his eleventh event!

This year UFV hosted the Fraser Valley Regionals competition for Math Challengers (BCMC) on Feb 12 in Abbotsford. There were about 150 contestants in grades 8-9. (Note: BCMC is described in the report on Camosun College). They also hosted their 18th annual BC Math Competition for Secondary Students, with 130 students participating.

During the Spring Break, eight volunteers from UFV spent an entire day at Coquihalla Elementary School in Hope, sharing Math and Logic puzzles with 15 classrooms of students.

Vancouver Island University

VIU took part in a hugely successful Pi Day (March 14) event at Departure Bay Elementary School where they presented math puzzles to some 'amazing' kids. The event was run by the Nanaimo Science and Sustainability Centre. VIU also sponsored the regional BC Secondary Schools Math Contest.

Thank you to those Associates who are taking the time to do Math Outreach – whether or not PIMS provides financial support. Also, thanks to the following individuals who contributed to the writing of this Report.

Susan Chen (Camosun), Deanna Baxter (Capilano), Jim Bailey (COTR), Natasha Davidson (Douglas), Nora Franzova (Langara), Jason Schaad (Okanagan), Richard Taylor (TRU), Cynthia Loten and Susan Milner (UFV), David Bigelow (VIU).

**ADULT BASIC EDUCATION MATHEMATICS WORKING GROUP REPORT
PRESENTED TO THE BCCUPMS MEETING, MAY 11-14, 2015**

presented by Gabriela Kakushkin for Costa Karavas (co-chair ABE Math Working Committee)

Meeting: Adult Basic Education Mathematics Working Group

Date of meeting: March 5-6, 2015.

Location: Vancouver Community College (Downtown Campus)

1. **ABE returns to a tuition fee model as of April 2015.** Institutions can charge up to \$1,600 per full-time semester. Post-secondary institutions offering ABE programming are implementing tuition differently. The BC Ministry of Advanced Education announced that eighteen public post-secondary institutions, will be receiving a total of \$6.9 million of onetime funding for Adult Basic Education (ABE) to aid in the transition to the new tuition fee model. Students attending a public post-secondary institution in B.C. and enrolled in skills upgrading or education and training courses in Adult basic education, Adult special education and English as a second language can be eligible for financial assistance from the “Adult Upgrading Grant” (substituting the “Adult Basic Education Student Assistance Program-ABESAP). Students would have to meet the criteria.

Tuition fee model in ABE will affect enrolment as students will experience added financial difficulty in obtaining the upgrading courses they require for entrance into post-secondary programs and as a result a decline in enrolment is anticipated across the province from institutions that offer ABE programming.

2. **Articulation of ABE courses** amongst post-secondary institutions that offer ABE programming.

3. **Reports and presentations**

- i. Melissa Horner, Education Officer, Math Curriculum and Assessment, Ministry of Education. Course Equivalency and External Credit, update on grades 10-12 curriculum changes and timelines. The ABE committee is working on redefining one of its courses to match the Foundations of Mathematics 11 curriculum.
- ii. ABE Steering Committee Report—Allison Alder, Co-Chair, ABE Steering Committee.
- iii. BCCAT Update—Ruth Erskine, Committee Coordinator, BCCAT
- iv. Ministry Update—Tegan Tang, Education Officer Colleges and Skills Development Branch, Ministry of Advanced Education
- v. Dr. Peter Liljedahl, Associate Professor, Faculty of Education, Simon Fraser University

Math Challengers Report to the BCcupms – 2015

For Grade 8 and 9 students who love Math, Math Challengers is a truly rewarding and enriching experience. The competition consists of solving math problems individually and in teams with the prospect of trophies, medals and prizes when it's over. Brief talks or other math-related activities are also part of the day. In the Face-off stage, the top ten students compete one-on-one to see who first solves a problem. Parents, coaches and the other competitors thoroughly enjoy the excitement of this event.

This year over 781 students participated at the Regional level, which is slightly less than the number in 2014. Grade 8 teams came from 43 different schools and Grade 9, from 50 schools. Students are also permitted to register as individual competitors. Top teams and Individuals then advance to the Provincial competition, which was held at SFU this year. It's a really fun day for all!

Math Challengers 2015 Regional Competition				
Grade 8	Lower Mainland	Vancouver Island	Okanagan	Fraser Valley
Schools	26	4	3	10
Teams	46	8	5	21
Competitors	221	40	21	97
Grade 9				
Schools	31	5	7	7
Teams	54	8	11	12
Competitors	259	38	50	55

This year 20 Grade 9 students selected from high scoring individuals at the Provincial competition were invited to an Enrichment Day held at UBC. The day was spent touring a few demonstration facilities, hearing brief talks on math and engineering topics, being presented with challenging puzzles and enjoying a special lunch on campus.

All this is possible because of dedicated volunteers and committed teacher coaches, as well as financial assistance from organizations like PIMS, BCAMT, BCHydro, IBM and APEGBC. UBC, SFU, BCIT, Camosun College, Okanagan College and UFV provide generous competition site hosting support.

For the Regional competition, besides the main competition site on the Lower Mainland, we also have competitions on Vancouver Island, in the Okanagan and in the Fraser Valley. Satoshi Tomoda originated the Okanagan event and Ian Affleck leads the one in the Fraser Valley. Colleges and universities are ideal sites for hosting MC. We'd love to see this opportunity also for kids in the Kamloops and Prince George regions.

For information about MC: <https://www.apeg.bc.ca/Math-Challengers/Math-Challengers-Home>

For previous competition problems: <http://www.math.ubc.ca/~adler/challengers/>

Leo Neufeld
May 13, 2015

**MINUTES OF THE STATISTICS SUBCOMMITTEE
93rd BCcupms MEETING, MAY 12 – 13, 2015**

Wednesday, May 13th, 2015

Present: Bruce Dunham (UBC-V), Jason Loepky (UBC-O), Kevin Craib (Langara College), Alan Meichsner (Douglas), Shane Rollans (TRU), Susan Chen (Camosun), Mary Lesperance (UVic), Paul Ottaway (Capilino U), Joyce Kwan (Acenda)
Apologies for absence received from Richard Lockhart (SFU), Allan Majdanac (Douglas), and Veda Roodal Persad (TRU-OL/Langara)

Chair: Bruce Dunham

Acting Secretary: Jason Loepky

1. Approval of Agenda

Motion to approve agenda: Moved: Kevin Craib; seconded: Susan Chen. **Carried unanimously.**

2. Approval of minutes of the Statistics Subcommittee Session of the 92nd meeting.

Kevin Craib pointed out that a statistics course was erroneously recorded with a MATH, rather than STAT, code. This correction was noted.

Motion to approve minutes: Moved: Susan Chen, seconded: Kevin Craib. **Carried unanimously.**

3. Matters arising from minutes

None.

4. Institutional Reports

Acenda

There are three courses in mathematics and statistics in Acenda School of Management (ASM):

BADM 120 College Business Math

BADM 221 Fundamentals of Economic and Business Statistics, and

BADM 222 Management Science.

Two new Faculty members joined the Mathematics Department in 2014; Joyce Kwan teaches Business Math and Statistics whereas Dr. Eric Korolenko teaches Management Science. At present, there is no Department Head in the Mathematics department.

There have been no changes in the use of the textbooks in the three courses that would affect the transfer credit or articulation. Almost all new students in the BBA degree program at Acenda take the Business Math course and many also take Statistics, which is a prerequisite for concentrations such as in Marketing, Human Resources Management and for courses such as Organizational Behaviour that require statistical tools for their case analyses. Most students at Acenda are international students and some new students may already have a Bachelor degree in Engineering in their own countries, therefore they may be offered a credit transfer for the Statistics course. However, this group of new students are required to take the first year level College Business Math. They usually show their strong Math ability, whilst students who have prior degrees in other fields may find the College Business Math and Statistics to be challenging. Regular tutorials are offered each week to give extra help for this group. The enrolments in these three courses are:

BADM 120 College Business Math: 13 to 35*

BADM 221 Fundamentals of Economic and Business Statistics: 15 to 30*

BADM 222 Management Science: 8**

*Courses are offered four terms in a year.

** This course is offered one to two terms a year.

In the course BADM 221, students are encouraged to use Microsoft EXCEL for their assignments, but in tests and examinations students are only allowed to use a scientific calculator or a graphing calculator.

Camosun College

The biggest news is that the department changed name from “*Department of Mathematics*” to “*Department of Mathematics and Statistics*” in September, 2014. The five statistics courses will have their labels changed from MATH to STAT, for the purpose of clarity, starting September, 2015. There is much appreciation of everyone’s effort in making this change possible, in particular the strong support from the Dean of Arts and Science, Dominic Bergeron, and the rest of the college community. The name change process was quite complex - it caused many cascading curriculum changes across the college as well as many course re-articulations with BCCAT. Happily, the enrollments in statistics courses were up slightly last year, including the calculus-based statistics courses.

In regard to statistical software, there has been a successful move to the open source statistical software R from Minitab in September, 2014 for the Applied Statistics course and the two calculus-based statistics courses; the elementary statistic course has been using MegaStat add-ins in Excel for three years and it has worked well.

Another noteworthy piece of news is that, since last September, WeBWorK has been used for online assignments in the Applied Statistics and Elementary Statistics courses. This has been an exciting move, not only because WeBWorK is completely free for the students, but also because the students’ personal information is saved on the college server. It is Camosun College’s privacy policy that no personal data should be saved in the US. WeBWorK moves the department away from publishers’ online assignments where student information could be saved on US servers if a publisher were based in the US.

Capilano University

The total of introductory statistics sections has remained at eight in 2014/2015 with full classes. For many of students, it is a terminal course to satisfy program requirements. The sustained enrolment can partly be attributed to the cancellation of computer science offerings two years ago which could previously be used to satisfy the same requirement.

Capilano may undergo significant changes to its faculties and program offerings. It is unclear how this may affect offerings in statistics though many of the proposed science diplomas will have a statistics requirement which could further drive demand in the future.

Douglas College

Demand for the non-calculus based statistics course remains strong due to an entrance requirement for the nursing program. We offered 15 sections last year and plan to offer another 15 sections in the coming year. There are no plans for any changes in the topics covered for this course, but there will be a switch from the DeVeaux *et al.* textbook to a Triola book in the Fall and some of the existing tutorials will be replaced with Excel-based ones.

There have been no changes with respect to the calculus-based statistics course.

Langara College

The statistics area at Langara College is currently comprised of 12 faculty members (10 FT, 2 PT). In 2014, a total of 65 sections of statistics courses were offered to approximately 2000 students. Of these sections, 54 (80%) were introductory courses and the remaining 11 (20%) were intermediate level courses. The introductory courses STAT 1123 (Basic Probability and Statistics for Business) and STAT 1124 (Statistical Methods I) continue to exhibit the largest enrolments. A new course for international students enrolled from a new post-degree diploma program in business (STAT 4800 – Business Statistics). Three sections of STAT 4800 were conducted for approximately 75 international students in the fall semester.

Statistical software packages that are used in both introductory and intermediate level courses include: StatGraphics Centurion and MS Excel. An on-line, one-semester course using Excel (Stat 1182) is offered.

Simon Fraser University

Robin Insley and Rick Routledge will both retire shortly. Luke Bornn has been hired.

There are no significant changes in course structures or enrollments this year though some students were lost this year because Engineering stopped using the second year calculus based introduction, STAT 270. Engineering accreditation rules and the SFU budget model give the Engineering departments an incentive to teach their own course.

The department continues to work on strengthening the computational components of the programs; in particular a course along the lines of "Introduction to Data Science" may be introduced.

University of British Columbia, Okanagan

The university is in the final stages of recruiting a new assistant professor position. John Braun has been recruited as the new head and things are on an upward trajectory. Enrolments remain fairly constant in introductory courses. The upper level enrolments are variable depending on who is teaching. Enrolment in the major is very small. The major is currently being re-vamped in order to accommodate a new MSc. in Data Science. A Statistics stream has been added to the M.Sc. and Ph.D. in Mathematics program. There are additionally proposals for a new Data Science minor and a new course "An Introduction to Data Science".

University of British Columbia, Vancouver

The number of students on Statistics programs stood at a record 221 at the start of the academic year, 100 more than the figure from 2009. The major remains the most populated specialisation, and for the first time the Combined Major with CPSC stands second, having moved ahead of the Combined Majors with Economics. In total 42 graduated on our programs this academic year. This year saw the launch of a new course, STAT 357 (cross-listed at EECE 357), "Stochastic Signals and Systems". Prof Ruben Zamar was involved in the creation and teaching of this new offering. The EECE pre-requisite (EECE 269) is a barrier to statistics specialists, though two statistics students did take this course this year with success.

In January Prof Sara Mostafavi joined from Stanford, a joint appointment with Medical Genetics. In other staff news, Prof John Petkau is currently President of the SSC.

The third year of funding from UBC's Teaching and Learning Enhancement Fund (TLEF) for the WeBWorKiR project saw the software introduced in STAT 306 (Finding Relationships in Data), 404 (Design and Analysis of Experiments), 443 (Time Series and Forecasting), and SPPH 400. Some new features were added, including the ability to use a randomly generated data-set across several homework questions, the software remembering information used to simulate the data for each student. Remaining funds will be used to create questions for STAT 344 (Sample Surveys), and if time permits, STAT 406 (Statistical Learning). Details on the project, including installation guidance, can be found at

http://wiki.ubc.ca/Documentation:WeBWorK/The_WeBWorKiR_Project:_Integrating_WeBWorK_with_R

The department is leading a large-scale initiative in "Flexible Learning" funded by the TLEF. This project involves faculty from seven UBC departments, and aims to create a set of resources that can be used in teaching introductory statistics courses.

Deliverables will include on-line visualisation tools, screen-casts, in-class activities, case studies, and WeBWorK questions.

Initially a focus is on support for teaching the sampling distribution of the mean. All resources created will be open-source, and made freely available.

University of Northern British Columbia

It has been a very quiet year with respect to courses so there is no change to any of the STAT offerings and no changes are expected in the near future.

Lee Keener is retiring as of July 1st, 2015. It is not known if there will get a replacement position. If there is, it will not be before July 1st, 2016.

University of Victoria

A CRC II in Biostatistics is to be hired and negotiations are continuing. The department is also hiring two Assistant Teaching Professors, one with a speciality in Statistics.

Science students are being encouraged to take a minor in Statistics.

A new textbook is sought for Stat 255 and Stat 256, Introductory Probability and Statistics for Science students (non-calculus based). The current book is out-of-print.

Math 352 students have been directed to take Stat350. It is believed that Math 352 will be phased out.

Most courses currently use R.

5. Articulation agreements between Alberta and BC

There had been a request from the BCCUPMS chair for representatives to identify at their institutions existing articulations with institutions in Alberta for Calculus I, II, and Introductory Statistics. There had been some response to this request, for which the chair expressed thanks with a reminder to those who had not responded.

The overall goal was to extend formal articulation agreements to Albertan institutions, at least for the three broad classes of courses identified above. There was agreement within the subcommittee that this proposal was sensible and feasible, at least for introductory statistics courses. More contentious was the proposal to identify a "common core" for introductory courses. There was much discussion on this point. The chair identified three broad classes of introductory course: those for students with a low

mathematical background (such as courses aimed at students in Arts disciplines), non-calculus courses for students with a stronger mathematical background (such as Science students), and calculus-based courses for engineering students. Although core topics could be identified, that would give little information about how the topics are taught and assessed. It is also evident that the larger universities in BC differ appreciably in their introductory offerings.

A possible advantage to identifying core content is in assisting the creation of new courses. This was recognised, though it was felt that the gain may be outweighed by the cost, particularly as colleagues in fields such as psychology, economics, and commerce were unlikely to pay regard to our proposed core topics.

6. Outreach to K-12 teachers (Bruce Dunham, UBC)

There has been a proposal from the Education Committee of the SSC to attempt to provide support to school teachers who teach statistics at K-12. Alison Gibbs (University of Toronto) has spear-headed the Census@School initiative in Canada (see www.censusatschool.ca), but has expressed concern that while school teachers may be adept when teaching descriptive methods, they may struggle with inferential concepts. The difficulty is how to best provide support to teachers.

The SSC is supporting a conference at Western in July entitled “Innovation and Scholarship in Statistical Education”; given the timing, it is thought unlikely teachers would attend. Similarly, sessions held for teachers during the SSC conference would probably not attract sufficient numbers, unless somehow coinciding with local Pro-D days. A more viable and impacting option would be to liaise with local education ministries and teachers unions within provinces with the aim of coordinating short workshops for relevant teachers on Pro-D days. If suitable materials were created (by the SSC or whoever), there was some willingness within the subcommittee to be involved running such workshops.

The chair will pass on the proposal to both the SSC’s Education Committee and Education Section.

7. Any other business

The issue of handling cases of academic misconduct was raised by Kevin Craib. Incidences of cheating and plagiarism have been on the rise at some institutions. Lack of time permitted a full discussion, and it was proposed the matter would be addressed at next year’s meeting.

8. Motion to adjourn

Moved: Susan Chen, seconded: Paul Ottaway. **Carried unanimously.**