

**Physics & Astronomy Articulation Committee Meeting**  
**1 May 2015**  
**SFU, Burnaby, BC**  
**Halpern Centre Room**

Present:

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- 1. Introductions, Welcome by Jeff McGuirk and Dean Claire Cupples**
- 2. Approval of Agenda**
  - Moved, Seconded, and Carried.
- 3. Approval of 2 May 2014 Meeting Minutes**
  - Moved, Seconded, and Carried.
- 4. Matters arising from minutes Corrections/changes to Textbook Lists/Articulation Charts which are online at the BCCAT Articulation Committee website**
  - If there are any changes required, please let Andy Sellwood (VCC) know.
- 5. BCCAT issues and information - Pending Requests in the Transfer Credit Evaluation System (TCES)**
  - Is there a mechanism to regenerate requests? SFU is currently on a lot of the requests, but they are not appearing. This may be an internal issue.
  - Contact for transfer credit information can be found on the BCCAT website. This person should be able to find the requests if it is still in the system. Requests remain in the system for one year.
- 6. BCCAT Update – Anna Tikina**  
JAM
  - On Nov 6, there will be discussion on different issues in the post-secondary system in BC.
  - The 2014 meeting had a good response. This year's meeting is expecting around the same number of people (~150).

#### Council Awards

- Please contact BCCAT if you would like to nominate someone. The update report also includes a link where you may send in nominations.

#### International Student Survey

- Received a good response (~25%).
- Institution data can be obtained from Institutional Research offices at participating institutions. An overall report is expected to be published in the coming fall.

#### Implications on New High School Graduation Requirements

- The plan is circulate this within the registrars and institutions to gain a better understanding of how institutions admit students and how these admission models interface with the proposed changes in the high school graduation requirements.
- More discussion regarding this topic will follow.

#### BC Transfer Students Profile and Performance Reports

- This year, universities have been asked to provide data for an aggregate system level report on student transfers. This will be posted online later this month.
- Please direct any questions you may have to Anna Tikina.

#### Dual Credit: Secondary to Post-Secondary Transitions: Dual Credit Policy and Practice in BC and Elsewhere

- Policy has different purposes in different jurisdictions.
- There is currently no data on how many dual credit students in BC.

#### International Students in BC's Education System

- There is increasing interest in raising the number of international students within the province.
- International students are tracked from K-12 to post-secondary to see where they end up.

#### Post-Secondary Student Mobility Highlights

- This is an unfinished project on how students are moving, and how the credits transfer between institutions.
- The inclusion of private institutions is complicated due to legal differences.
- Starting from 2012-2013, course transfer credits have been tracked using the Ministry of Advanced Education database (Central Data Warehouse – CDW). Contact Anna Tikina for more information about a specific institution.

### **7. Fall 2014 Joint Annual Meeting – Bob Wood**

#### JAM 2015

- The System Liaison is attempting to invite more senior administrators to participate and connect with the Articulation Committee in order to bring in new perspectives.

#### JAM 2014

- The keynote covered the BC education plan, a personalized education pathway for students. This plan has been in progress for 5 years, with a number of the strategies implemented in lower grades and now high school as well. The Ministry of Education has been supportive of the initiative.
- Although it sounds like a good idea, it is administratively difficult to handle. The plan affects students' paths to university because it changes how they are assessed.
- The initiative is rolling out regardless. The involvement of post-secondary institutions can vary.

### **8. Google group**

- Feedback? No complaints.

#### **9. Confirmation of date and place of 2016 meeting**

- May 6, 2016: Prince George at UNBC for Engineering, and CNC for Physics.
- 2017: Victoria Island, either UVIC or Camosun
- 2018: Terrace at Northwest (tentatively)

#### **10. Roundtable reports/brief discussions of significant curriculum changes and associated issues**

*See attached departmental reports appended to the minutes. Further notes from the discussions are summarized below.*

##### UBC- Vancouver

- Changes made to Phys 117/118/119 will allow students to transfer from Science to Engineering easier and articulation simpler. Re-articulation process to start in the near future. Syllabus will be distributed to the committee for reference.
- Second year courses will be revamped as well. They will have to go through re-articulation when finished.

##### Alexander College

- Will be introducing an astronomy program.

##### BCIT

- The entirety of the operating grant will be spent on lab equipment.

##### Camosun

- There have been significant changes to all Physics courses because the school is moving to a semester system. First group of students under this system will start fall 2016, with a 2 year conversion period.
- Students are having issues transferring specialty courses. They receive the diplomas but are unable to do anything with it afterwards.

##### Capilano

- 2 year program in STEM.

##### CNC

- There was a round of layoffs last week, which is affecting courses being offered. Physics is still going strong.
- Last year we offered Phys 101 and 102 (calculus based Physics) both in face to face and online format. The labs for the online delivery were done on the weekends.

- This year Phys 105 and 106 lectures (algebra based Physics) are no longer offered in Prince George in face to face format but via videoconference from Quesnel campus. Labs are done locally on both campuses.

#### College of the Rockies

- There was a large number of course offerings this year.
- One of the Engineering instructors has retired. They are currently in the hiring process with interviews starting next week.

#### Columbia College

- Several summer courses will be offered on Wednesdays and Saturdays; none of them are Physics courses.

#### Coquitlam College

- There has been no interest in opening second year courses.

#### Kwantlen Polytechnic University

- Instructors are enjoying OpenStax because it is editable to suit instructor needs.
- Engineering and Life Science are currently doing the same labs. There aren't many Life Science labs or Life Science-based labs, but would like to add more. Any suggestions on how to implement this are welcomed.
- There is a lot of overlap between Physics 1100 and 1120. The content of the courses and sequence of the courses are being reexamined. The goal is to reduce overlap but still ensure that it is transferrable.
- The Astronomy class is capped at 35 with 8 sections per year. If the administration allows it, more sections could be offered.

#### Langara College

- Newtonian Mechanics course has experienced an increase in enrollment. Previously, students have had trouble transferring this course. UBC's courses will be examined to evaluate whether this issue can be resolved.

#### NIC

- ABE numbers are up in Port Alberni.
- The collaboration between NIC and Rockies is still ongoing. It has been successful so far.

#### Northern Lights

- Committee member not present. The reason quoted was that there is no funding for articulation.
- BCCAT regulates that all institutions must devote the funding for articulation meetings. This issue should be investigated.

### Northwest Community College

- Adult education funding has been reduced by half; this is damaging enrollment numbers.
- Although enrollment from local high schools is down, enrollment from other regions are increasing.
- Since four years ago, faculty numbers have been reduced from 27 to 15.5. There has been no reduction in administrative staff.

### Okanagan College

- There are only 6 Physics full-time-equivalent faculty members across four campuses.

### SFU

- Logarithmic and Blues course was very popular but enrollment numbers have dropped. The plan is to stop offering it for a few semesters, then bring it back.
- Barbara Frisken will be giving a presentation at the BCAPT on revamping lab design. This will be a process that heavily involves everyone from instructors to TAs.
  - The Physics lab space has been redesigned and will be able to accommodate 100 students per lab section. Each section will be lead by one instructor, about 4 TAs, and a lab technician.
  - Students will no longer write lab reports, rather they will keep a reduced lab notebook documenting the procedures and relevant figures. Record-taking skills and technical skills will be developed in second year courses instead.
- A different model for paid components of a course (ie. textbooks, online programs) is being discussed campus-wide. An umbrella policy including publisher-created resources and encouraging open access resources is being formed, with an eye toward the institution's role in the education process. The administration has suggested that the components be developed in house and shared between institutions.
- BC's version of FIPPA and SFU's implementation is strict compared to UBC, UVIC, and other institutions, causing problems with using many educational resources.
- Pilot study will be starting this summer regarding how products are being used as quality assurance on their efficacy.

### Thompson River University

- Calculus based physics course enrollment has completely dropped. This may have been due to counselors telling students that the course is not required for a stream.
- Astronomy course is filled for the summer.

#### Trinity Western University

- Biolab may be a viable alternative to Neulog as it is Bluetooth and only \$100 per piece.
- Administrative training for Chairs is being explored.

#### UBC Okanagan

- The Engineering program is rejecting Physics courses. If a student start in the science stream, they are encouraged to take Physics equivalent of the engineering course.

#### UFV

- Committee member not present due to illness.

#### UNBC

- There are currently no known changes to physics are planned. However, in the current state changes, including a strike, new president, new provost, and the general program under review over next two years, this may change.

#### VCC

- Currently asking for new physics lab to be built. However, the approval of request will depend on the popularity of the Physics course.
- The program is heading towards design of studio physics model which promotes student engagement.

### **11. Update on curriculum work for physics K-12 – Angie Calleberg**

- The Ministry of Education has been involved in this curriculum transformation since 2011. This presentation will give context on the work and invite feedback about the challenges that have come up. The results will be transparent to the BCTF and publicly available online.
- The website has been overhauled to reflect the changes. Feedback was also collected during the development of the curriculum drafts and published online. The website is still a work in progress but it provides lots of opportunities to support teachers in how they want to shape learning at local level. The interactive website provides breadth and depth to material.
- The curriculum framework is based on core competencies and the material is concept-based. The drafts for the curriculum have been in development since 1989. Although it is old, it still works as a foundation piece for the transformation of the curriculum initiatives.
- The core competencies include 3 categories, which are embedded in the work in the KDU model.
- Lynn Erickson has been recruited into the Ministry to guide the initiative.
- Feedback was collected to develop curriculum drafts were published online
- Link to the EDUC web site:  
[http://www.bced.gov.bc.ca/irp/transforming\\_curriculum.php](http://www.bced.gov.bc.ca/irp/transforming_curriculum.php) where there is

a link to the first drafts of the new curriculum for review and feedback at [www.curriculum.gov.bc.ca](http://www.curriculum.gov.bc.ca) . EDUC is encouraging feedback.

- They are currently working towards getting revised drafts finished for grade K-9 by June, some for grade 10, potential directions for grade 11-12 by this summer. The curriculum for grade K-9 will be designed to align with grade 10-12. The goal right now is working towards proposing ideas for optional sciences in grade 11-12 grades, and what would be required in grade 10.
- The science curriculum draft for Physics is organized in topics for earth vs. space.
- Graduation curriculum includes core concepts that are covered, with optional topics that can be chosen. This provides greater flexibility in graduation years and support local context and student interest.
- This renewed science curriculum drafts allows students to take classes any time between grade 10-12, creating a continuum rather than a rigid plan of what happens in each grade.
- Collaboration with people leading other subject will be necessary to ensure good alignment and minimal overlap.
- This module may create admission problems, gaps in student knowledge, and create issues in evaluation. Secondary teachers also don't inherently have a lot of training in teaching science, especially for math and physics. High school students' math skills are already insufficient; how can this be remedied? This module does not affect course equivalencies for post-secondary institutions.
- This module is meant to allow students to see science as a general approach to learning, rather than viewing it as the fragmented topics it currently is.
- Questions for the Committee:
  - What opportunities do you see in the renewed science curriculum drafts?
  - What are your thoughts on course modules being combined to create personalized science courses for students?
  - Are there any issues that we should be aware of from a post-secondary perspective?

## **12. Afternoon discussion topics and tour**

- ABE (Adult Basic Education)
  - Province has cut funding to ABE in all institutions, prompting the return of tuition fees (up to \$1600 per term for a full-time student).
  - VCC was given a pot of money for one year to cover tuition.
  - There exists an adult upgrading grant where students can apply for it if their annual income is <\$25,000 (minimum wage).
  - The President's group is examining the idea of going converting to prep classes, but funding for ABE has gone back and forth from free to payment required depending on the provincial government. However, if ABE is replaced by prep courses, it closes the door to free ABE because the courses are now in a tuition- based stream.

- It may possible to offer the same course with two different coding offered concurrently so one would be UT transfer, the other would be upgrading course. The course would have the same pre-requisite. The problem is that many institutions offer ABE differently depending on who is teaching: some are amalgamated and taught by different bargaining units.
- VIC: The government has underestimated how many students are applying for ABE. Someone has been hired help students apply for the grant.
- Okanagan: a motion passed supporting ABE because of the fear that if tuition is charged, then so do their enrollment numbers, as there are currently several adults in the program.
- Camosun: has a school of access for Math and Physics. 7 years ago they had to grandfather people to a separate school of access and ABE. There is also a fear that if the program is changed to prep, transferability will decrease, but as long as the courses are on the provincial education grid, the courses are marked equivalents.
- Students who hadn't finished high school or are under 19 years of age can do upgrades for free. There is also a loophole where if a student is under the age of 21 before the end of June 30, and are a resident of Vancouver, even if they've already graduated from high school, they can take any course paid for by the government. This loophole may be closed now.
- Kwantlen PU has issued lay-off notices to 17 faculty members in anticipation of lower enrollments caused by the reintroduction of tuition fees.
- UBC labs have not undergone any changes yet. 101 and 102 will be changed to the style of 119 for the upcoming summer. The next real offering will be next spring. This will also be the first academic cycle where 153 split into 157, 158, 159, similar to what is in the works for 119. VIU to follow up with UBC about this issue. A decision for the 117/118 textbook has not been made yet.

### **Adjournment**

- Moved and Seconded
- Carried at 15:30.

*Note: BCAPT Meeting, Tomorrow (Saturday), 2 May*

## Alexander College Physics Articulation Report

### Alexander College, Vancouver, May 1, 2015

Alexander College is a small private college that focuses primarily on foreign students who cannot get into the regular Provincial universities due to a lack of language and cultural skills. We have two campuses, one in Burnaby near Metrotown and the other in Downtown Vancouver opposite SFU Harbour Centre. We typically offer about 120 different courses with a combined enrollment of 1,200+ students.

Our general aim is to offer students a palette of first- and second-year courses along with intensive language training and small classes, where a large amount of personal attention is possible. The courses are designed to be at the academic standards of the corresponding introductory courses at SFU, UBC and UVic and, thus, to provide transferable credits to students who wish to gain entry to those institutions. We presently offer two-year “Associate” programs in Arts, Science, and Business, all of which include laboratory science requirements. We are in the process of developing a program of First-Year Engineering Transfer.

All Physics courses are offered at the Downtown campus limited to a class size of 20 students. Smaller classes allow students to more easily examine concepts in groups and share their results with the class. In addition, students are given the opportunity to work with concepts as they are being presented through active learning techniques and laboratory exercises.

Physics courses presently approved and on our books are:

Physics 100: Introduction to Physics

A one-semester preparatory course for students lacking physics background at the BC 12 level.

(Text: Knight, Jones, and Field, *College Physics*)

Note: Runs every semester; typically 50% students of the students who register in the course receive A or B grades.

Physics 101-102: Physics for the Life Sciences I and II

Two sequential one-semester algebra-based introductory physics courses for students concentrating in Biology and Chemistry.

(Text: Giancoli, *Physics: Principles with Applications*)

Note: Has not been offered since 2011.

Physics 141-142: Engineering Physics I and II

I: Mechanics and Modern Physics

II: Electricity and Magnetism, Optics

Two sequential one-semester calculus-based introductory physics courses designed for science and engineering students.

(Text: Cummings, Laws, Reddish, and Cooney, *Understanding Physics*)

Note: 141 or 142 runs every semester; typically 50% students of the students who register in the course receive A or B grades.

Physics 151-152-153: Our 3-course Engineering sequence

151: Mechanics for Engineers

(Text: Hibbeler, *Engineering Mechanics: Static and Dynamics*)

152: Oscillations and Waves, Fluids, Heat, and Thermodynamics

153: Electricity and Magnetism, Circuits, and Radiation

(Text: Knight, *Physics for Scientists and Engineers*)

Note: Approved but not yet offered.

Physics 191: Introduction to Astronomy  
(Text: Backman, *ASTRO*)

Note: Approved but not yet offered.

## **BCIT Physics Department Report, 2015**

The BCIT Physics Department has 11 full time faculty members, 3 technicians, and teaches around 1000 students in 17 different technologies. A summary of the courses taught by the Department is attached.

The entry requirement for BCIT's Electrical Engineering program has been increased from Physics 11 (C+) to Physics 12 (C+). The increased entry requirement has started a discussion of whether the physics courses taught to the Electrical Engineering students should become calculus based. If this change is made, additional Part-Time Studies courses will be added to allow students to take equivalent courses in the summer.

Our Grade 11 equivalency course (Physics 0309) was popular with two sections running in Fall 2014, and one section running in Winter 2015. We anticipate that this course may be less well subscribed now that the government has cut ABE funding and the course is no longer free.

James Brewer

## **Capilano University Physics Department Report to the 2015 Articulation Committee Meeting, SFU Surrey**

Our course offerings changed slightly from the previous year. Introductory, “calculus-based”, and “algebra—based” physics as well as our astronomy course without a lab were the same but the introductory astronomy (with lab) was not offered, nor was the course on sound and light, taken by students in motion picture arts (MOPA), liberal studies, and music. These reductions were in response to the financial issues mentioned in last year’s report.

The retirement of Stan Greenspoon on July 31 2014, led to the hiring of our new faculty member, Lauren Moffatt who joined the department for the 2014-2015 academic year. Bruno Tomberli has been acting as the convenor of the Physics department since Stan’s retirement.

Total enrollments in the courses also offered last year (i.e not counting the loss of enrollment due to the cancellation of the MOPA course on sound and light) were down about 5% from the 2013-2014 academic year. This close to the expected fluctuation level for our total enrollment.

No further cuts are proposed for the 2015-2016 academic year. In fact, a proposed expansion of the Engineering Transition Program from 35 to 70 spaces for 2015-2016 is expected to bolster Physics enrollments. No additional Physics offerings are expected to result from the Engineering expansion until the expanded cohort is in second year (2016-2017).

## **College of New Caledonia 2015 Physics Articulation Report**

CNC continues to offer calculus and algebra based physics courses (Phys 101/102 and Phys 105/106) to accommodate first year engineering transfer and general science transfer programs. We observed an increase in enrollment in calculus based physics in both semesters. However, algebra based physics classes suffered another decrease in enrollment and as a result of it, Phys 106 was cancelled in Prince George in the spring semester.

For the first time we delivered Phys 101 and Phys 102 online and there are plans to offer these courses again in 2015/2016, subject to budget approval. We also started delivering Phys 101 in the off-semester.

Due to low enrollment in algebra based physics 105/106 in Prince George, both courses will be offered next year via video conference from the Quesnel campus with labs delivered locally.

Barbara Rudecki, P.Eng.  
Applied Science/Physics Instructor  
College of New Caledonia

College of the Rockies

Institutional Report May 2015

Physics and Astronomy Articulation Meeting

- We lost our new faculty member who resigned for personal reasons. We are in the process of hiring his replacement. We will interview the four applicants at the end of the month.
- Astronomy will offered next fall. The current plans are to offer it every second year.
- North Island College and College of the Rockies again offered Engineering Statics and Dynamics collaboratively this year, in the same format as the last two years.
- We held a spaghetti bridge contest this year. Some entries were better than others. . .
- This coming year (2015{16) we are scheduled to offer
  - PHYS 103 (Introduction to Physics I, Calculus);
  - PHYS 104 (Introduction to Physics II, Calculus);
  - PHYS 141 (Engineering Statics);
  - PHYS 170 (Engineering Statics and Dynamics);
  - PHYS 201 (Classical Mechanics); and
  - PHYS 202 (Introduction to Modern Physics),
- Last year we did not offer PHYS 202!

Jim Bailey (BAILEY@cotr.bc.ca)

## **Columbia College**

### **2015 Physics & Astronomy Articulation Report**

Columbia College is completing our second year at our new campus and enrollment is still on the rise for the entire college, as well as the physics program. To meet the demand, the college has expanded the day by an hour and will begin to offer Saturday classes starting in Summer 2015. The physics department has grown due to demand and consists of two full-time faculty members, one part-time sessional, as well as a lab technician.

In 2014/15 Columbia College ran seven Physics courses, with five of them at the UT level and 2 at the secondary level:

- Physics 110 (Calculus based Newtonian Mechanics)
- Physics 120 (Calculus based Electricity and Magnetism)
- Physics 130 (Calculus based Optics and Thermodynamics)
- Physics 118 (Engineering Mechanics)
- Physics 200 (Introduction to Modern Physics)
- Physics 11
- Physics 12

The enrollment has risen significantly in our UT program. We are offering two sections of Physics 110 and one section of Physics 120 every semester. Physics 118 is being offered two times per year. Physics 130 ran for the first time in Winter 2015 and had a rather low enrollment of only 4 students but is necessary for full transfer to specific institutions. Physics 200 was offered two times and has had a slight increase in enrollment.

Enrollment in Physics 11 is low, with only 12 students (up from 7) in Fall 2015, but the enrollment in Physics 12 is high, with 31 students in Winter 2015. Throughout the year, Physics 11 and 12 courses are offered in alternating semesters.

We are preparing a second year Thermal Physics course to be articulated in Summer 2014.

Tara Todoruk  
Columbia College  
Vancouver, BC

## Coquitlam College

No significant changes in Physics curriculum at Coquitlam College. We offer only the 1<sup>st</sup> year calculus-based Physics courses; Physics 101 (mechanics with an introduction to thermal Physics) and Physics 102 (electricity, magnetism and optics). Physics 101 is offered in the summer and the fall semesters, Physics 102 is offered only once a year in the spring semester. The enrolment so far has been stable and good. As a rule, the classes of Physics 101 are full (100%), and the number of students enrolled in Physics 102 range from 14 – 18 (70 -90%). In the fall semester the number of students frequently increases above 20 (laboratory space limit) so that a second lab section has to be open.

## ***Douglas College Articulation Report 2015***

Enrolments have been steadily increasing and the Department is the largest it has ever been with three full-time faculty and two full-time lab demonstrators. For the first time in years we needed to hire contract faculty for the summer courses.

The College is expanding its engineering options. Two new programs, Engineering Foundation Certificate and Engineering Foundation Diploma, are in the final stages of development and likely will be launched in Fall 2015. The programs are based on our currently offered science courses as well as five new engineering courses. The College is building a new lab space just for engineering students. We are hoping to attract more international students to the programs as well.

For over a year already we have been using with great success an open source textbook called Physics by Open Stax. It works nicely for three of our courses: Phys1104 (Practical Physics), and Phys 1107 and 1207 (algebra-based Introductory Physics I and II). We are considering trying an open astronomy source based on N. Strobel's notes.

First-year astronomy for liberal arts majors continues to grow. We teach it at both our New Westminster and Coquitlam campuses as a night course with an integrated lab. This year, for the first time, we offered four sections of the course, rather than three as before, with one in the summer.

Three new physics courses, Phys 1108, 1208, and 1308, have been developed to match the SFU calculus-based introductory courses for Life Sciences Phys 101, 102, 130. We are evaluating the demand for those courses at the College in the near future.

With the expansion at the Coquitlam campus in 2016, when the Evergreen Skytrain line is finished, we propose to have the 2017 Articulation at our Coquitlam campus. The terminus station will be right at the campus and will be called "Douglas College".

*Submitted by Ioulia Kvasnikova*

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*Physics and Astronomy Chair*

*Science&Tech Department*

*Douglas College*

## **2015 Physics & Astronomy Articulation Report**

### **Department of Physics, Kwantlen Polytechnic University**

The second year of our BSc in Physics for Modern Technology (PMT) launched this year. Due to projected low enrollments, only our lecture-based courses ran (Modern Physics, E&M, Classical Mechanics, and Thermal Physics). However, despite the projected low enrollments, three of the four courses had about 10 students each. Our lab-based second year courses will run for the first time in 2015/16 (Experimental Physics, Electronics, and Sensors & Actuators), and our third year courses will launch in 2016/17.

The number of new applicants to PMT for Fall 2015 is very promising. As of mid-April, 135 students have applied to the program. Approximately one-third of those have chosen PMT as their first choice program at KPU. We thank VCC, Langara, and the BCAPT for their support and assistance in promoting the PMT program.

This year, most first year physics and astronomy courses have been full (with waitlists) or nearly full. Astronomy courses, in particular, have been very popular. As a result we ran an extra section of ASTR 1100 this Spring and we may run an extra section this summer. To accommodate the new first year PMT students, we will also run an extra section of PHYS 1120 on our Richmond campus this Fall, and likely an extra section of PHYS 1220 next Spring.

We have decided that meeting the ABE articulation requirements will no longer be a priority for PHYS 1100.

For PHYS 1100, several instructors have been using the open textbook “College Physics” published by OpenStax. This saves our students a lot of money and there is general agreement that the quality of the book is high. We are hopeful that a similarly high quality open text will soon be available for first-year calculus-based courses.

Several department members have been adopting the “flipped classroom” approach to some of their courses. This can involve, for example, making the lecture available online in video format before class, and then using class time to engage students in activities such as group problem solving. The reaction of instructors and students to this approach has been positive.

Fergal Callaghan  
Chair, Department of Physics, KPU.

## **Langara College Physics and Astronomy**

### **Articulation Report 2015**

Terry Coates: *tcoates@langara.bc.ca*

We had strong first-year enrolments in the 2014-2015 academic year. We ran 36 sections of physics and astronomy courses; 6 in Summer 2014, 14 in Fall 2014 and 16 in Spring 2015. We had waitlists for the majority of these sections.

#### **Astronomy Courses**

We ran ASTR 1101/3310 (one half-section of 1101 (for Science students) and one-half section of 3310 (for Arts students)) in the fall with the similarly organized ASTR 1102/3311 course in the spring. We noticed a decline in enrolment for the 3310/3311 sections, which may be due to the competition from a growing number of elective courses being offered around the college.

#### **Introductory Courses**

We ran 2 sections of PHYS 1114 (Grade 11 equivalent) in the fall and another 2 sections in the spring.

We ran 9 sections of PHYS 1118 (Grade 12 equivalent) which is one of our most popular courses. There were waitlists for this course every semester. For this course we use the OpenStax College Physics textbook, which is free to all students, and are planning to continue to use it for the upcoming year.

#### **1<sup>st</sup>-Year Courses**

We ran 9 sections of PHYS 1125 (Physics I with Calculus) and 3 sections of PHYS 1101 (Physics I for Life Sciences). PHYS 1125 is very popular and we have had large waitlists for this course. For 1125 we ran four sections in the fall and four sections in the spring as well as 1 section in the summer. For 1101 we run one section every semester.

We ran 4 sections of PHYS 1225 (Physics II with Calculus). We are getting increasing enrolment and demand for this course as more students are taking the preceding course PHYS 1125. One of the sections of PHYS 1225 in the spring (and one of the PHYS 1125 sections in the fall) primarily consists of the students in the Engineering Transfer Program (ENGT).

#### **2<sup>nd</sup>-Year Courses**

We ran our 2<sup>nd</sup>-Year physics program this year. In the fall semester we had 9 students in PHYS 2424 (Relativity and Quanta) and 5 students in PHYS 2309 (Intermediate Physics Lab I). In the spring semester we had 10 students in PHYS 2323 (Newtonian Mechanics) and 8 students in PHYS 2409 (Intermediate Physics Lab II).

#### **Other Courses**

We ran 3 sections (one each semester) of PHYS 1219 (Engineering Mechanics). We fill the fall and spring semester sections but have started to see lower enrolments in the summer semester.

#### General Notes

Except for the ASTR courses (and core course sections reserved for the ENGT students) we have 50% of each section (approx. 15-16 spaces per section) held for International Education (IE) students. As we get closer to the semester starting date any unfilled IE spaces are opened up to domestic students on the waitlist.

Construction on our brand-new Science and Student Services building is on schedule and we anticipate moving in sometime in summer 2016 with full operation scheduled for the Fall 2016 semester. We will have 3 dedicated lab rooms in the new department—two rooms will be labs for undergraduate courses and the third room will be a dedicated studio physics room.

Like many other institutions, Langara College is struggling with budget issues as the provincial grant decreases. The college administration is now revamping a lot of the current business practices and developing new procedures regarding budget planning and allocation of course sections. The college has been expanding and diversifying its recruitment of international students and we have begun welcoming a growing number of students from India. A large portion of these students are interested in getting into STEM fields and as a result we may be allocated more physics sections to accommodate the increasing demand.

Both the Langara Faculty Association and CUPE have ratified new agreements with the college.

# NIC Physics Articulation Notes 2015

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We have had no change in our physics offerings since last year. Our transfer courses in physics are:

- PHY 100/101 – Algebra based physics, for life sciences
- PHY 120/121 – Calculus based physics, for engineers, physicists, and most chemists
- PHY 141/170 – Engineering Mechanics (PHY 141 transfers to UVic Engineering, and PHY 170 transfers to UBC Engineering).

Enrollment in both streams of first year physics continue to be strong at our Courtenay Campus (waitlisted in September), and enrollment in both streams have increased at Campbell River Campus this year. Port Alberni Campus enrollment in first year physics remains low.

We did not offer our Space Science and Astronomy courses this year. We have a new part-time faculty member who is qualified and interested in teaching it, but we would have to find the financial resources to bring the courses back. Our new department chair will be exploring this.

## **Northwest Community College Physics Articulation Report 2015**

Northwest Community College (NWCC) serves the rich and diverse communities and learners of BC's beautiful northwest region including Haida Gwaii and the Great Bear Rain Forest. Aboriginal peoples comprise roughly 30 percent of the region's population, the highest among all BC college regions and, at NWCC, Aboriginals make up roughly 40 per cent of the student body. The university credit program has 15 faculty members across the region, down from 27 a few years ago.

We continue to run one section of algebra based physics 101/102 (using Giancoli) at the Prince Rupert Campus and one section of calculus based physics 121/122 (using Fundamentals of Physics, Halliday, Resnick, & Waker) and one section of physics 101/102 at the campus in Terrace. At the Terrace campus the students for 101/102 and 121/122 share the same lab time. At both campuses the class sizes are maxed out at 18 which is the maximum permitted in our lab. Both courses have 3 hours of lecture and 3 hours of lab each week for fourteen weeks and then one week for final exams in each term (Fall and Winter). Most of our advanced physics students continue in an engineering program at another institution.

Enrollment was lower at both campuses, with 16 total in Terrace and 6 in Prince Rupert. The low enrollment is likely due in part to the physics 11 and 12 equivalent courses being cut a few years ago and lack of marketing.

Regan Sibbald

## **Okanagan College – May 1, 2015 Physics and Astronomy Articulation Report**

Our Science numbers overall were up slightly this year (+3.6%). Science at Kelowna (+1.8%), Penticton (+29.6%), and Salmon Arm (+7.7%) were up. The numbers in Vernon dropped (-9.3%). Kelowna represents 56.4% of our Science students, Vernon 19.3%, Penticton 17.3%, and Salmon Arm 6.9%.

The numbers in Physics at Kelowna this year were down for the calculus-stream (-19.4%) and down (-22.2%) for the algebra-based (-21.1% overall). Our Physics numbers in Penticton were up for the calculus-stream (+800%) and up (+11.1%) for the algebra-based (+47.4% overall). Our Physics numbers in Vernon were down for the calculus-stream (-50.0%) and up (+40.0%) for the algebra-based (-17.9% overall). Our Physics numbers in Salmon Arm were up for the calculus-stream (+50.0%) and down (-84.6%) for the algebra-based (-52.9% overall).

Applications in Science for next year are up slightly overall (+1.7%) with substantial growth in Kelowna (+23.3%) but drops in Penticton (-35.8%), in Salmon Arm (-66.7%), and Vernon (-6.5%).

Attrition in first-year Physics was not a major problem this year. Most of the attrition still occurs in the first semester.

This year we offered three second-year Physics courses. They were Modern Physics (OC PHYS 200) with 6 students, Thermodynamics (OC PHYS 215) with 13 students, and Statics and Dynamics (OC PHYS 202) with 7 students. OC PHYS 215 is better protected now since it forms part of the Engineering Bridges for both the ELEN and CIEN programs into UBC-O Engineering. We had three (3) students last year in the Bridge and have 6 qualified students this year apply so far for the Engineering bridges.

The numbers in Astronomy at Kelowna, Penticton, and Vernon this year were down (-27.3%, -50%, and -14.3% respectively).

We did offer our two second-year Astronomy courses for Science and Arts students this year (ASTR 220 – Astrobiology with 7 students versus 12 last year and ASTR 230 - History of Cosmology with 8 students versus 14 last year).

Arts numbers at OC have dropped each of the past three years which is causing our Astronomy numbers to drop.

We had one faculty member leave this year and have one member on Extended Study Leave. That means we are looking for Full-time Continuing faculty member for Kelowna and a Full-time Term faculty member for Penticton with some travel to Kelowna, in addition to a half-time term faculty at Vernon with some travel to Kelowna. We are looking for applicants with strong teaching skills who would enjoy teaching both lectures and laboratories. We expect one retirement this coming year (summer 2016 hire) and another in the year following (summer 2017 hire).

Yours sincerely,  
Richard Christie.



## Selkirk College Physics and Astronomy Articulation Report

May 2015

Selkirk College continues to offer the same physics courses in 2014-2015 as in the previous year to accommodate the first year engineering transfer program as well as general arts and science students. No major changes occurred to the physics courses in 2014-2015.

The courses offered include algebra based PHYS 102/103 and calculus based PHYS 104/105, as well as Principles of Mechanics (PHYS 200). In addition, the College offers PHYS 050 and PHYS 060, which are equivalent to high school level Physics 11 and Physics 12, respectively. Textbooks remain the same for the university level physics courses for the past two years (and for the upcoming year). Namely, the algebra-based physics utilizes *Physics* (9<sup>th</sup> ed.) by Cutnell & Johnson, and the calculus-based physics utilizes *Fundamentals of Physics* (10<sup>th</sup> ed.) by Walker et al.

In the past, Astronomy 102 (Introduction to Astronomy), which is intended for students not majoring in science and contains a lab component, has been offered at least once every two years. However, this course has not been offered since winter semester 2013. An attempt was made to offer the course for winter 2015, but faculty suitable for the position could not be procured. Astronomy 102 has proven to be a popular course and is likely to be offered again in the coming year or two.

Enrollment in physics courses at the Castlegar campus remains roughly unchanged from the previous year. The algebra-based physics had a small decrease in enrollment, while the calculus based physics and the provincial level physics saw a small increase in enrollment. It is expected that enrollment will increase in the calculus-based physics in the upcoming year. This is due to the novel influx of 17 Rural Pre-Medicine students (a program initiated in 2014) and an anticipated full engineering cohort.

The lab component of the university level physics courses continues to emphasize written reports, and utilizes *Logger Pro* software for data gathering and analysis. A minor new course outcome of the calculus-based physics

involves the student being able to write solutions to physics problems in a very complete manner, similar to an example solution of the physics textbook utilized. Student feedback has been positive; they are glad to have learned a valuable skill that can be utilized in their future post-secondary education.

## SFU Departmental Report 2015

There have been no major curriculum changes in the core lecture courses in 2014-15, but our lab curriculum is undergoing revision. The list of streams and textbooks remains the same.

### First-year Textbook Summary:

Physics 100 (physics 12): Knight, Jones and Field - College Physics

Physics 101/102 (algebra): Giancoli - Physics: Principles with applications

Physics 120/121 (calculus): SmartPhysics + Tipler (optional)

Physics 125/126 (enriched): Halliday, Resnick and Krane

Physics 140/141 (studio): SmartPhysics + Tipler (optional)

Enrolment is slightly down, with 2014/15 annual enrolments:

Physics 100: 675

Physics 101: 633

Physics 102: 584

Physics 120: 428

Physics 121: 310

Construction work on our introductory lab space and the Trottier Observatory and Studio for Innovative Science Education is now complete. The renovated introductory lab space allows for larger enrolment and more flexibility in the use. The Observatory has a 6 m dome and houses a 0.7 m reflector telescope, and the Studio will host workshops and outreach programs for all ages.

We have undertaken a major revision of our lab curriculum. PHYS 131-2 (lab for university physics) has been discontinued and replaced with PHYS 132-1 and 133-1. These labs consists of eight 3-hour lab sessions for one credit each, taken concurrently with PHYS 120/121 or 125/126. They are designed with a research-based approach, focus on measurement and comparison, and move away from more proscribed “activities.” We have scaffolded data analysis techniques (estimation, spreadsheeting, graphing, fitting) as well as uncertainty analysis through the two-course sequence. Every experiment incorporates an “invention activity” to stimulate student thinking on data analysis and culminates in some form of comparison and opportunity for refinement. Future curriculum development will examine the skill progression and scaffolding throughout the entire undergraduate lab sequence.

Our existing PHYS 125/126 enriched sequence is joined by enriched Math courses (MATH 125/126) and enriched Chemistry courses (CHEM 123/124). Currently open to any interested high-achieving students, program entry will eventually be through competitive application only. We will be initiating an undergraduate seminar course (pilot to run in 2015/16). The primary goal of this course is to enrich the student experience beyond their academic training. It will expose them to opportunities available

to students with a physics degree - including academic research opportunities, industrial physics, and nontraditional careers – and foster skills necessary for success.

Lastly, SFU has begun to discuss the use and cost of modern textbooks and digital resources (e.g. Mastering Physics, Smart Physics, etc.). Concern over rising costs, mandatory graded components that must be purchased, and the perceived outsourcing of some educational activities have prompted institutional discussion of the use of these resources and possible alternative pricing strategies.

Jeffrey McGuirk, Undergraduate Chair, Dept. of Physics, SFU

# TRU Physics/Astronomy Articulation Report

Mark Paetkau (mpaetkau@tru.ca)

May 1, 2015 – SFU Burnaby

## 2014/2015 Enrolment Summary

<b>Fall 2014</b>	<b>Winter 2015</b>	<b>Summer 2015 (as of Apr 22)</b>
Astr 1140 – 64	Astr 1150 – 63	Astro 1140 – 45
Ephy 1150 - 57	Ephy 1250 – 45	Astro 1150 – 20
Phys 1100 – 127	Phys 1200 – 103	
Phys 1150 – <b>35</b>	Phys 1250 – 24	
Phys 1510 – 26	Phys 1610 – 26	
Phys 1010 – <b>Not Offered</b>	Phys 2200 – 6	
Phys 1580 – 55	Phys 2250 – 8	
Phys 2000 – 9	Phys 4140 – 10	
Phys 2150 – 10	Phys 4400 – 10	
Phys 3080 – 9	Phys 4480 – 1	
Phys 3250 – 10	Phys 4500 – 8	
Phys 3400 – 9		
Phys 4480 - 1		

## **First year totals**

<b>Year</b>	<b>Fall</b>	<b>Winter</b>	<b>Summer</b>
2014/2015	364	261	65
2012/2013	429	250	76

2<sup>nd</sup> year fall saw increase in students (mostly international)

3<sup>rd</sup>/4<sup>th</sup> year enrolments were stable  $\approx 10$  students/course

## **Textbook Changes:**

None reported

## **Curriculum Changes:**

New vectoring of digital electronics course from (0,2,3) to (3,0,3).

## **Other Changes:**

Due to family day, only 9 labs and lab exam were offered in winter first year courses.

Offering of 2<sup>nd</sup> year electrical engineering leverages existing physics courses, so enrollment in some 2<sup>nd</sup> and 3<sup>rd</sup> year courses expected to increase.

## Physics at Trinity Western University

Report for the BC Articulation Committee Meeting  
1 May 2015

by Dr. Arnold E. Sikkema  
Professor of Physics  
Chair of the Mathematical Sciences Department  
Trinity Western University

- TWU Physics mainly serves our B.Sc. programmes in Biology and Chemistry, as well as our Engineering Transfer Programme, but also offers one course each year for non-science students.
- Physics is part of our Department of Mathematical Sciences, which includes math, computing science, physics.
- Enrolment in our first-year calculus-based physics sequence (with lab) was about normal for the fall (59) & but much higher than normal in spring (57), with just one failing 111 in the fall and  $x$  failing 112 in the spring, where  $x$  may be known by the time of our meeting. We continue to use Knight's *Physics* (3<sup>rd</sup> edition) and *MasteringPhysics* for these courses.
- All our other courses are offered on an alternate year basis, to allow students to complete a minor or concentration, with zero to three graduating per year with these options. (One graduated in 2015 with a concentration [10 courses].)
- One student who transferred to UBC to complete his physics major (an option we do not have) is now an SFU graduate student.
- Enrolments in 2014-15 were:
  - 210: Conceptual Modern Physics: 11
  - 230: Electricity & Magnetism (with lab): 2
  - 310: Modern Physics: 2
  - 341: Advanced Physical Chemistry (with lab, and cross-listed with Chemistry): 1
- Courses planned for Fall 2015 are:
  - 215: Astronomy (taught by adjunct professor Dr. Barry Pointon from BCIT; enrolment capped at 20 due to observing sessions)
  - 360: Optics, with lab (enrolment 2 thus far)
- Courses planned for Spring 2016 are:
  - 220: Mechanics
  - 240: Physical Chemistry (with lab, and cross-listed with Chemistry)
- Point for discussion: Does anyone use the NeuLog sensor system in their labs? See [neulog.com](http://neulog.com). We are considering our options to replace or upgrade our GLX/Pasco system purchased in 2005.

## Articulation Report 2014-15 - UBC Okanagan

The past academic year has witnessed some decline in first-year Physics enrolments. In the fall term there were 498 students (down from 650 last year) altogether, counting both algebra- and calculus-based streams, and in the spring term there were 448 (down from 568). This continues a trend that started last year, when enrolments declined from all-time highs attained the year before. As a minor consolation, we have seen some increase in retention rate from first to second semester. This year's numbers reflect an overall decline in first-year enrolments in Arts and Sciences at UBCO, and is not peculiar to Physics. It is apparently due to lower application rates rather than acceptance rates.

Second- and upper-year enrolments in Physics are, however, holding their own for the time being. Core second-year courses this year had enrolments as high as 45 (Thermodynamics), and core upper-level courses as high as 30 (Quantum Mechanics). Several core upper-level courses that previously ran on a two-year rota are now being or planned to be run annually. There has been a marked surge in class sizes, with about 30 students declared as Physics majors at the second-year level (roughly double last year's figure). The number of Physics graduates expected this year is, however, a mere 5 (1 Honours + 4 Majors), versus 13 last year.

The Open-Stax courseware package has been adopted this year for the algebra-stream first-year courses, and has been generally well received (thanks to the endorsements it received at last year's Articulation Meeting).

There is ongoing discussion of eliminating the algebra-based stream in first year, and subsuming it into the regular calculus-based stream with additional tutorial time provided for the less-prepared students who would formerly have chosen the algebra-based stream. This change would be accompanied by making Calculus a corequisite for all first-year Physics students.

No changes have occurred in our undergraduate program during the past year, except the addition of two new fourth-year courses, one in low-temperature Physics and the other in data- and image-processing (with emphasis on medical imaging).

A Medical Physics postgraduate program is just now in the final stages of approval, and is expected to be launched in the coming year. One new faculty member (Andrew Jirasek) was hired last year to lead this initiative, and one or two new positions are currently being filled to reinforce it. It is expected that this will also drive undergraduate course development, with some of the new postgraduate courses being cross-listed as senior undergraduate courses, both to expand undergraduate offerings and to serve as a recruiting ground for the postgraduate program.

## **BCCAT Articulation Committee Report for the SFU Meeting -- May 1/15**

Michael Hasinoff --- UBC-Vancouver April 27, 2015

The big change for this year is the introduction of a new 3 credit Phys 117 course that will contain a higher level of mechanics and be more suitable for Physical Science students than our current 3 credit Phys 101 course. With the demise of the BC provincial exam in Physics 12 we have noticed a decline in the level of the student's knowledge of the basic principles of mechanics. Phys 117 will not have any associated Lab but we have introduced a new 1 credit Phys 119 Lab which will be required for all Phys/Astr specializations and will be patterned after our successful Phys 107/109 Lab. Phys 102 (E&M + radioactivity) will be relabeled as Phys 118, and will no longer have an integrated lab (Phys 101 will retain its integrated lab). The sequence of courses for a Physics degree will now become Phys 117/118/119 (or the enriched Phys 107/108/109) rather than Phys 101/102. We are considering changing our Phys 101 course into a Life-Science Physics course, perhaps with a separate lab, in the next few years. Our new curriculum chair, Tom Mattison, will present these changes in detail at the May 1<sup>st</sup> meeting which I cannot attend since I am currently in Japan.

In 2014 (May and November) we graduated 62 students in our various Physics specializations and 8 students in Astronomy. We also graduated ~ 50 students in Engineering Physics. The total number of students enrolled in years 2-3-4 of our various different PHAS specializations in 2014/15 is 272, an increase of 10 from last year and 25 from 2012/13. Majors Physics continues to be our largest specialization with 87 students, followed by Honours Biophysics (39), Combined Major Phys/CpSc (34), Hons Phys/Math (27) and Hons Phys (26). The number of Combined Honours Phys/CpSc students has doubled from 7 to 15.

Our enrollments in Phys 100/101/102 are up about 6% over last year to 836/1671/532, respectively. The new Vantage College program (foreign students not taught primarily in English) had 103 students (in Phys 107V). The enrolment in our non-science elective Astr 311 continues to decline (from 97 to 55) but the enrollment in Astr 200 has increased significantly from 61 to 91.

# 2015 Articulation Report

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## Department of Physics, University of the Fraser Valley

April 23, 2015

This past academic year 2014—2015, we filled a total of 1012 seats across all physics courses (including engineering, engineering physics, and astronomy). Breaking our enrollments down by category:

- ⑩ We again filled all 48 seats in the two ABE courses that we offered. And, once again, we had to leave some students on the waitlists.
- ⑩ We ran a pair of introductory astronomy courses, each with a class maxima of 36. Both sections filled; both sections had long waitlists.
- ⑩ Enrollment in first year, algebra-based physics was down, from 90 seats taken last year to 80 this year. The culprit seems to be our introductory classical mechanics course which just hasn't been enrolling well as of late.
- ⑩ Enrollment in first year, calculus-based physics was up ~4% from the previous year. We filled a 394 seats, our second highest total ever.
- ⑩ Enrollments in our first year engineering transfer courses were strong, as always. All four courses we ran from this category filled with waitlists.
- ⑩ After last year's record shattering numbers, our second year and upper division physics enrollments have dropped back to Earth. We still posted a strong showing; however, numbers were down essentially across the board for 200+ level physics classes.

At this summer's convocation, we are expecting to award seven physics majors degrees and two physics minors. These numbers are preliminary, however, and just might go up.

This past year, we welcomed a new faculty member, Dr. Lin Long, to our department. Lin holds a PhD in Control Theory and Engineering as well as a P.Eng, and has several years' worth of experience in both academia and industry. In the years to come, Lin's teaching duties at UFV will focus primarily on several of the upper division courses that we created last year as part of our new Engineering Physics Diploma in Mechatronics.

Speaking of mechatronics, this past September, we officially launched our new program with an initial cohort of about 14 students, mostly domestic. Over the next few years, we will be looking to increase the number of international students in the program in accordance with the budgetary model that we proposed as the program was making its way through the approval process.

Recently, we signed off on an ambitious transfer agreement between UFV and Yangtze University, an institution in Jingzhou, China with a student population of roughly 34,000. Under the terms of this agreement, students would study for two years at Yangtze university followed by two years at UFV after which they would graduate with a joint Bachelor's Degree Programme in Mechanical Design Manufacturing and Automation from Yangtze University and a Bachelor of Science Degree in Physics from UFV. Yangtze University is looking to enrol 100 students annually in this program. What fraction of the 100 will actually end up at UFV? That remains to be seen. The agreement has been signed by UFV's president and has been sent to for approval to the Chinese Ministry of Education.

In cooperation with our adjunct faculty members from the BC Cancer Agency in Abbotsford, the department has developed some new courses in the area of medical physics. Specifically, we have put together a third year Radiation Protection and Radiobiology class and a third year Special Topics in Physics course that is intended primarily to run as a directed studies class in medical physics. Also, we have upgraded a Survey of Medical Physics class from first to second year by adding more material and contact time and by increasing the course's pre-requisites.

This past year, the Department of Physics was approached by management concerning a potential merger with some members of UFV's Department of Computer Information Systems (CIS) to form a joint Department of Physics and Computing Science. Ultimately, the idea was nixed, and, instead, the entire CIS Department was moved from the Faculty of Science to the Faculty of Professional Studies. From a financial perspective, this is going to put even greater pressure on the Physics Department next year as CIS was the department within the Faculty of Science the generated the most revenue, some of which was shared with the lab sciences areas.

**University of Northern British Columbia Physics  
Department  
2015 Articulation Report**

First-year calculus-based physics had a decline in enrollment, and there were corresponding declines in first-year calculus and chemistry. The enrolment in first-year algebra-based physics was unchanged, as was the enrollment in second-year physics. The enrolment in Astronomy remains low. The changes to first-year labs (new experiments, doubling of sections) went smoothly. No changes to the Physics program are planned.

## UVic 1<sup>st</sup> and 2<sup>nd</sup> year PHYS and ASTR articulation report, April 2015

### 1<sup>st</sup> year PHYS:

There were no significant changes in our offerings this year. We experienced further growth in enrolment in our calculus-based offerings. Last year's increase was primarily because of a large increase in the ENGR cohort; this year's increase is more broad-based. There is a much larger increase in initial registration than there is in students who complete the full course. There is some anecdotal evidence that students are choosing our PHYS 110/111 sequence instead of PHYS 102 in part because of increased flexibility associated with multiple entry points.

#### Courses offered:

PHYS 102 (two-term course) – An algebra-based survey of physics.

Primary Audience: Biology students

Text: Serway (algebra based, latest edition)

Enrolment: Initially around 500.

Final enrolment: 2015: 446 (2014: 399, 2013: 436)

Normally offered Sept-April.

Topics: Mechanics and energetics, oscillatory and wave motion, fluids, thermodynamics, electricity and magnetism, optics, modern physics

PHYS 110 (first term) and 111 (second term) – A calculus-based survey of physics

Primary Audience: Natural Science and Engineering students

Text: UVic custom edition Young & Freedman with locally-written supplements.

Enrolment: Initial (fall) enrolment peaks at 750-800

Final enrolment 110: Fall'14: 609, Spring'15: 159 (Fall'13: 566, Spring'14: 134)

Final enrolment 111: Spring'15: 473, Summer'15: 93 (Spring'14: 435, Summer'14: 73)

(Prior to reorganization enrolment at end of 2nd term was 350-400)

Normally offered Fall and Spring (110), and Spring and Summer (111)

Topics: As for 102, with limited content on fluids and electromagnetism

110 – Mechanics, conservation laws, electric and magnetic forces

111 – Thermodynamics, oscillatory and wave motion, optics, modern physics

PHYS 120 (first term) and 130 (second term) – Physics for Physicists and Astronomers

Primary Audience: Prospective major/honours students

Text: Young and Freedman – University Physics with Modern Physics (latest edition)

Enrollment: Initially peaks at 120-140

Final enrolment 120: 2014: 104 (2013: 106, 2012: 116)

Final enrolment 130: 2015: 69 (2014: 72, 2013: 66)

Normally offered Fall (120) and Spring (130)

Topics: As for 102 omitting Electricity and Magnetism and Thermodynamics

120 – mechanics and special relativity

130 – rotational motion, oscillatory motion, waves, modern physics

## 2<sup>nd</sup> year PHYS:

The University of Victoria offers five second year Physics courses, four of which are common to all our undergraduate programs. These have had fairly stable enrollment for the past years. This year we have seen lower spring enrolment and higher summer enrolment than in the previous year.

### Courses offered:

#### PHYS 210 (also EOS 210) – Geophysics

Primary Audience: PHYS/EOS combined program students

Text: Selections from several books, including Lillie – Whole Earth

#### Geophysics

Enrolment: About 60 (20 as PHYS, 40 as EOS).

Normally offered in the fall.

#### PHYS 214 – Laboratory Electronics

Primary Audience: PHYS and ASTR major and honours students

Text: Horowitz and Hill – Art of Electronics

Enrolment: 2014: 54 (2013: 46, 2012: 46, 2011: 41)

Normally offered in the fall.

#### PHYS 215 – Introductory Quantum Physics

Primary Audience: PHYS and ASTR major and honours students

Text: Varies depending on instructor, usually Thornton and Rex

Enrolment-Spring: 2015: 35 (2014: 32, 2013: 48, 2012: 44)

Enrolment-Summer: 2015: 17 (2014: 17, 2013: 9, 2012: 19)

Normally offered in the spring and summer.

#### PHYS 216 – Introductory Electricity and Magnetism

Primary Audience: PHYS and ASTR major and honours students, and Engineers

Text: Excerpts from Young and Freedman – we are looking for a better text.

Enrolment: 2014: 53 (2013: 54, 2012: 61, 2011: 53)

Normally offered in the fall.

#### PHYS 217 – Introductory Thermodynamics

Primary Audience: PHYS and ASTR major and honours students

Text: Carter

Enrolment-Spring: 2015: 36 (2014: 27, 2013: 46, 2012: 34)

Enrolment-Summer: 2015: 8 (2014: 14, 2013: 7, 2012: 12)

Normally offered in the spring and summer.

## 1<sup>st</sup> year ASTR:

The University of Victoria offers three 1<sup>st</sup> year Astronomy courses, two intended for non-majors and one that is the first course in our ASTR progression. Enrolment in the math-heavy first-year ASTR course is increasing steadily.

### Courses offered:

#### ASTR 101 and 102 – Astronomy for non specialists (101-Solar System, 102-Cosmology/Stars)

Primary Audience: General interest

Text: Varies depending on instructor

Enrolment: About 400-450 in ASTR 101; about 200-250 in ASTR 102. At least one section of each offered fall and spring. At least one normally offered in the summer. This year there were 4 sections (2 Fall, 2 Spring) of 101 and 3 (1 in Fall, Spring, Summer) of 102. Total enrolment

#### ASTR 150 – Concepts in Astronomy

Primary Audience: Astronomy major/honours students

Text: Varies depending on instructor

Normally offered in the spring.

Enrollment: 2015: 83 (2014: 67, 2013: 55, 2012: 45)

## 2<sup>nd</sup> year ASTR:

The University of Victoria offers three second-year Astronomy courses, one intended for general interest, and two that form part of our ASTR program. ASTR 201 is a recently developed course.

### Courses offered:

#### ASTR 201 – Search for Life in the Universe

Primary Audience: General interest

Text: Readings

Enrolment: 40-50.

Normally offered in the fall.

#### ASTR 250 – Introductory Astrophysics

Primary Audience: ASTR major/honours students

Text: Freedman and Kaufman - Universe

Enrolment: 2014: 24 (2013: 30, 2012: 21, 2011: 20)

Normally offered in the fall.

#### ASTR 255 – Planetary Science

Primary Audience: ASTR major/honours students

Text: Varies depending on instructor

Enrollment: 2015: 10 (2014: 11, 2013: 16, 2012: 10)

Normally offered in the spring.

## **Vancouver Island University**

report to the

### **Physics Articulation Meeting (01-May/15)**

1. Student numbers were stable in our 1<sup>st</sup> year. Life sciences courses (P111/P112) down by ~20% (this year\*: 82/63; last year: 100 / 75) while calculus based courses (P121/P122) have dropped by slightly less (this year: 67/49; last year 56/46). This drop may be exaggerated due to the timing of when the enrolments counts for last year were taken.

\*Enrolment in Nov/2014 (PHYS 111/121) and Mar/2015 (PHYS 112/122)

2. Astronomy continuing to run two 1<sup>st</sup> year (solar system, stars & galaxies) & two 3<sup>rd</sup> year (cosmology, history). Numbers are fairly steady compared to last year (this year 114; last year 115) and the classes are just slightly under their capacity. A total of ten (10) viewing nights were held over the Fall and Spring semesters.

3. Physics for (primarily) education students has showed a steady decline over the last few years (this year: 16; last year: 20). This course will not be offered in subsequent years.

4. SCIE 254 resources have been re-allocated to re-launching PHYS 216 (Introduction to Electromagnetism) this coming Fall (2015). This course was offered in the past but was dropped when the 2<sup>nd</sup> year Physics transfer program was cut. It is being brought back to supplement 2<sup>nd</sup> year course offerings for students enrolled in the new Fundamental of Engineering Certificate and planning to complete their studies over two years instead of one.

5. The annual Extreme Science show (benefiting the charity LED Africa) continues to be popular with 2000 attendees (mostly K-12 students) over six sessions.

## **Report to UT Physics and Astronomy Articulation 2015 Vancouver Community College**

We offered one section of the first half of our calculus-based 1<sup>st</sup> year physics (PHYS 1100) in fall 2014. We ran both a PHYS 1100 and a second-half (PHYS 1200) in winter 2015.

The 1<sup>st</sup> year engineering transfer certificate mentioned last year was approved in November 2014. We attempted a soft launch in January 2015 which was moderately successful. Starting in September 2015 early registration into PHYS 1100 and 1200 will be made available for students who are registered in the VCC Engineering Certificate.

Two new courses are in the process of being added to the Engineering Certificate; Engineering Graphics and Design (SCIE 1151) and Mechanics 1 (PHYS 1170). Transfer credit will be asked for SCIE 1151 to transfer to UBC as APSC 151 and to SFU as MSE 100. Transfer credit will be asked for PHYS 1170 to transfer to UBC as PHYS 170. These courses are not intended for students transferring to SFU Engineering Science. They are for students interested in competitive entry to UBC engineering.