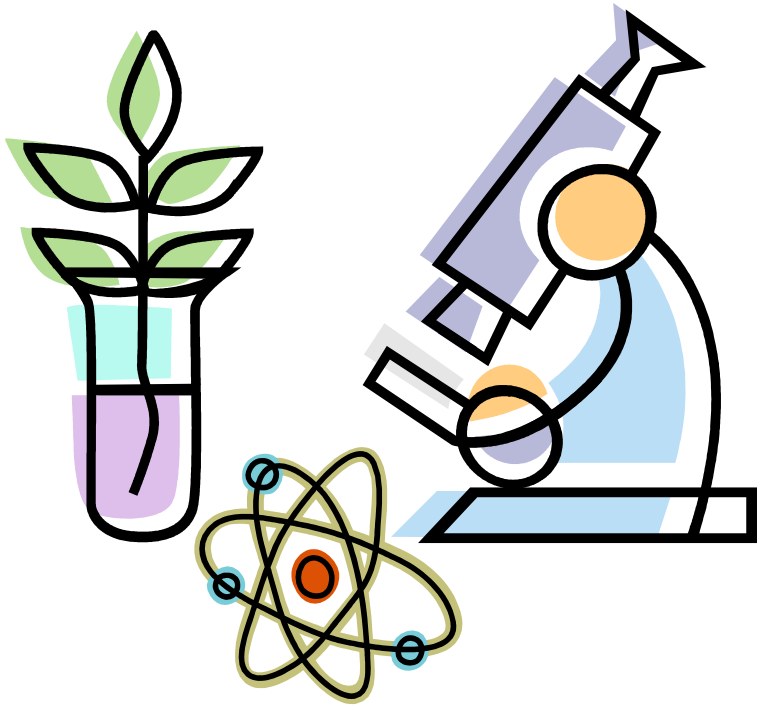
BCIT 2014/2015 Biotechnology Career Awareness Program



This package contains:

- Program Overview
- Summary of Events
- Criteria
- Workshop Descriptions
- Career options
- Application form

Program Overview

Welcome to the thirteenth year of the Biotechnology Career Awareness Program. The program is directed at Grade 10, 11 and 12 students with an interest in science and is built on a partnership between BCIT, Life Sciences BC, local biotechnology companies and participating school districts.

The program consists of a series of integrated elements (please see Summary of Events):

- A student application and selection process
- Final student selection
- Laboratory workshops at BCIT
- Industry visits

There will be **48** openings for the workshops and industry visits. The program will assign an initial student quota to each district and every effort will be made to accommodate interested students if district quotas are not filled.

Districts will be responsible for student selection ensuring that students meet the selection criteria (please see Selection Criteria and the attached application form). **It is very important that students rank their workshop preferences rather than indicating only their first choice.** If students are only able to make one of the workshops, we will do our best to accommodate them.

The program will provide bus transportation (when applicable) between the laboratory and the industry site. The Biotechnology Career Awareness Program working group endeavors to improve the program each year. We welcome your feedback on any part of the program at any time.

Thank you for helping make the program the success it has become.

The Program Planning Committee

Getting Started

- ✓ Students meeting the stated selection criteria apply to their teachers using the application form (last two pages of this document).

- ✓ District coordinator, teacher or school representative sends application forms **via e-mail** to biotech@bcit.ca BCIT Biotechnology department by **NOVEMBER 7, 2014**.

NOTE TO TEACHERS/FACILITATORS: Please submit completed forms as soon as they are received to secure seat booking. Applications are accepted from September to November and workshop placements are on a **first-come first-served** basis. Accepted students will be notified via email the week of November 14th, 2013.

- ✓ **NEW! Please note that the course fee is now 180$:** Due to continued increases in expenses/supplies and our desire to maintain the highest quality student experience possible, we are making this necessary adjustment. This is the first increase in over 5 years.

- ✓ In order to confirm seat, each student fee payment **MUST** be received by BCIT **no later than FRIDAY NOVEMBER 21, 2014**. If payment is not received by deadline, seats will be offered to applicants on the waiting list.

November 7, 2014.	Deadline for submission of student applications to BCIT.
November 21, 2014	Deadline for cheque payment from students
December 8-12, 2014	BCIT workshop A (includes industry visit)
April 27-May 1, 2015	BCIT workshop B (includes industry visit)

Send application forms to:

NEW! Email: biotech@bcit.ca

After receiving confirmation of acceptance, send 180$ cheque to:

Leesa Watt
Program Manager, SOH
SW 3 3089,
BCIT
3700 Willingdon Avenue
Burnaby, BC V5G 3H2

****Make cheque payable to BCIT BIOTECHNOLOGY.Clearly indicate "Biotechnology Career Awareness Workshop for (name of student)" on the front of cheque**

Criteria

Eligible students must:

• Have an expressed interest in science-related curriculum, be enthusiastic about scientific research and lab work, and be interested in learning about careers related to biotechnology

• Be a Grade 10, 11 or 12 student

• Actively participate in the lab-based workshops and attend all sessions

• Be able to initiate and maintain conversation with practicing professionals at an industry site concerning occupational information and scientific focus

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Refund Policy

Refunds for students who cancel their participation in the Program will be reviewed under BCIT's part time studies refund guidelines and ultimately determined by the staff in BCIT's School of Health Sciences. **Please contact Leesa Watt 604-432-8831 or** biotech@bcit.ca **to discuss cancellation and refund process**. The cost for each workshop is $180.00/student, this includes the materials and transportation to and from for the industry visit, if needed.

- ✓ **NEW! 1 week notice for cancellation is required in order for student to receive refund**

BCIT Workshop Description

Monday Lecture AM Lab PM	What is biotechnology? ▪ Renaissance or Revolution ▪ The component technologies ▪ Applications of Biotechnology Basic Biotechnology Principles ▪ Cell theory ▪ The role of Protein ▪ How genes are turned into proteins ▪ Extra-chromosomal DNA Part 2:The Component Technologies ▪ Selective breeding ▪ Selective mutation ▪ Recombinant DNA technology Lab1: Use of Micropipettors and Spectrophotometers Lab 2: Preparation of culture Lab 5: The growth of mammalian cells
Tuesday Lecture AM Lab PM	Cell Culture Theory ▪ Defining Cell Culture ▪ Animal Cell culture ▪ Plant Cell culture Cell Fusion Technology ▪ What is cell fusion? ▪ Gene transfer by cell fusion ▪ The monoclonal antibody Fermentation Technology ▪ What is an enzyme? ▪ Bioreactors Enzyme Technology ▪ What is an enzyme ▪ Uses of enzymes Immobilization Technology ▪ Definition ▪ Uses Lab 3: Plasmid Preparation Lab 6: Plant and Cell Culture

Wednesday Lecture AM Lab PM	Application of Biotechnology Applications in Health Care ▪ Diagnosis of disease ▪ Treatment of disease Applications in Plant agriculture ▪ Genetic engineering in plants ▪ Micropropagation of plants ▪ Biological Fertilizers Applications in Animal Agriculture ▪ Animal health ▪ Reproductive manipulation in animals Lab 4: Restriction digests and gel electrophoresis
Thursday Lecture AM Lab PM	Application of Forestry ▪ Genetics enhancement of trees ▪ Disease control ▪ Seedling productions ▪ Forest products biotechnology Food Biotechnology ▪ Bioprocessing ▪ Fermentation ▪ Single Cell Protein Environmental Applications ▪ Sewage treatment ▪ Bioremediation ▪ Biological mining Mining Biotechnology ▪ Bioprospecting the seas ▪ Aquaculture Lab 8: ELISA Lab 7: DNA fingerprinting
Friday Lecture AM PM	Ethics in Biotechnology ▪ Biomedical ethics ▪ Environmental release ▪ Food safety and quality ▪ Animal well being ▪ Social and economic consequences ▪ Intellectual property Industry Visits

Workshop Information

Note: An e-mail with location and schedule details will be sent 2 weeks before start dates.

December 8-12, 2014
April 27-May 1, 2015

Biotechnology Laboratory
SW09 208, BCIT Burnaby Campus

Careers in Biotechnology

In Research & Development

– **Research Scientist**

Responsible for initiating, directing and executing all preclinical scientific research and/or development strategies for a company through the research staff or individual studies which are critical.
Typically requires a PhD in a scientific discipline.

– **Research Associate**

Responsible for research and/or development in collaboration with others for projects.
Typically requires a B.Sc. or a M.Sc. in related field.

– **Laboratory Assistant**

· Responsible for performing a wide variety of research and/or development laboratory tasks and experiments.
Requires a high school diploma or some laboratory experience.

– **Quality Control Analyst**

Responsible for conducting routine and non-routine analysis of raw materials, in process, and finished formulations according to standard operating procedures.
Typically requires a B.Sc.

– **Quality Assurance Associate**

Responsible for performing a wide variety of activities pertaining to assuring compliance with applicable regulatory requirements by conducting audits, training programs, data and documentation reviews and analysis.
Typically requires a B.Sc.

In Regulatory Affairs

– **Regulatory Affairs Associate**

Responsible for the coordination and preparation of document packages for regulatory submissions to regulatory bodies, such as the Food and Drug Administration (FDA) in the US and the Therapeutic Drug Program in Canada, from all areas of the company, internal audits and inspections.
Typically requires a B.Sc.

– **Manufacturing Associate**

Responsible for the implementation of production and large scale manufacturing procedures to optimize processes and regulatory requirements.
Typically requires a B.Sc.

– **Process Development Scientist**

Responsible for the development of methods for the production, purification, fermentation and testing of new process formulas, technologies and products.
Typically requires a PhD in a scientific discipline.

In Clinical Research

– **Medical Director**

Responsible for managing the direction, planning, execution, and interpretation of clinical trials (clinical trials are research involving humans) and the data collection activities.
Typically requires a MD or PhD.

– **Medical Writer**

Responsible for researching, writing, and editing clinical reports, summarizing data from clinical studies for submissions to the FDA and for publication and/or presentation.
Typically requires a B.Sc. or M.Sc.

– **Clinical Research Associate**

Responsible for the design, planning, implementation and overall direction of clinical research projects.
Typically requires a B.Sc., RN or BSN degree.

– **Biostatistician**

Responsible for the design, development, modification and evaluation of a technical infrastructure to expedite conducting and evaluation of clinical trials.
Typically requires a M.Sc. or PhD.

In Corporate Affairs and Administration

– **Business Development Manager**

Responsible for managing the research and analysis of business opportunities and assessing potential markets to make recommendations for new projects to be used for strategic marketing decisions.
Typically requires a B.Sc. and a MBA.

– **Market Research Analyst**

Responsible for researching and analyzing the company's markets, competition and product mix.
Typically requires a Bachelors degree.

– **Patent Agent**

Works with scientific staff to prepare for filing and processing of patent applications for the company.
Typically requires a Bachelors degree.

– **Librarian**

Responsible for efficient management of in-house library.
Typically requires a MLS.

– **Corporate Communication / Investor Relations**

Responsible for planning, preparing and disseminating information concerning the company to the internal and external investment community.
Typically requires a Bachelors degree and a MBA.

– **Controller**

Responsible for coordinating, administering and controlling the financial operations of the organization.
Typically requires a B. Commerce and an accounting designation such as CGA or CA.

– **Facilities Management**

Responsible for managing the design, planning, construction and maintenance of equipment, machinery, buildings and other facilities.
· Typically requires a Bachelors degree.

– **Technical Services Associate**

Responsible for providing technical direction and support to customers on operation and maintenance of company products.
Typically requires a Bachelors degree.

– Health & Safety Specialist

Responsible for developing, implementing and monitoring industrial health and safety programs within the company.
Typically requires a Bachelors degree.

– **Purchasing Specialist**

Responsible for obtaining materials, scientific equipment and services and office/business supplies.
Typically requires a Bachelors degree and PMAC designation.

– **Human Resources Associate**

Responsible for one or more of the following activities in human resources administration including employment, compensation, benefits, employee relations, equal employment opportunity or training programs.
Typically requires a Bachelors degree.

Program Contact

If you have any questions regarding this information or the program please contact:

Leesa Watt 604-432-8831 or
Carol Fong 604-453-4074

Or e-mail
biotech@bcit.ca

Planning Committee Members

Post Secondary:

Dr. Lesley Esford – NRC-IRAP
Dr. Paul Barran –NRC-IRAP
Dr. David Ng – UBC

Industry Representative:

TBA

Program Manager:

Leesa Watt BCIT Biotechnology Program

BCIT 2014/15 CAREER AWARENESS

E-MAIL APPLICATION FORM send to biotech@bcit.ca

COMPLETE THIS FORM AND RETURN IT TO YOUR TEACHER

Applicants Last Name:_____ First Name:_____

Address:_____

City:_____ Postal Code:_____

Telephone:_____ Email:_____

Date of Birth:_____

Gender: _____

Grade: _____ School:_____ District #:_____

Teacher's Name:_____ Average Grade (letter):_____

Did you apply to this program in 2013/14? ☐Yes ☐No

BCIT will possibly be using photographs of participating students for promotional material for this program. Parental permission is needed.

My personal information (photographic/video image only) may be collected under the Authority of the Institute Act (RSBC 1996, Ch.225) for the purposes of instruction or promotion. I hereby authorize BCIT exclusive permission to use this information for purposes of promotion of BCIT programs and graduates and marketing in any published or displayed media format for no charge.

Participant Name:_____
Parent Name:_____
Parent Signature:_____
Date:_____

Please rank your workshop attendance order of preference.

1. **Please rank your choice: 1= 1st choice 2 = 2nd choice**

❑ Workshop A (**December 8-12, 2014**) ❑ Workshop B (**April 27- May 1, 2015**)

Please answer the following questions:

1. What are your long-range career goals?

   _____
   _____
   _____
   _____

2. On a Scale from 1 to 10 (10 being very comfortable), how comfortable are you asking questions to professionals and post-secondary instructors? _____

3. What courses have you taken in secondary school that would relate to this career field?

   _____
   _____
   _____
   _____

4. What have you done to prepare yourself to study and work in this area (volunteer experience, related jobs, extra curricular activities, etc.)?

   _____
   _____
   _____
   _____
   _____
   _____
   _____