2014

FANS 01312 Chemical Laboratory Technology - Science Lab CVS Application

Fanshawe College

Ontario College Quality Assurance Service
Service de l'assurance de la qualité des collèges de l'Ontario

ONTARIO COLLEGES OF APPLIED ARTS AND TECHNOLOGY
CREDENTIALS VALIDATION SERVICE
APPLICATION FOR PROGRAM VALIDATION

This proposal will be sent to MTCU for Approval for Funding ___X___Yes _____ No

1. College: Fanshawe College

2. College contact person responsible for this proposal:
Name: David Machacek
Title: Chair, School of Applied Sciences and Technology
Telephone: 519-452-4430 ext. 4590
Electronic mail: dmachacek@fanshawec.ca

3. Proposed Program Title: Chemical Laboratory Technology – Science Laboratory

4. Proposed Credential: (please indicate below)
Local Board Approved Certificate ☐
Ontario College Certificate ☐
Ontario College Diploma ☐
Ontario College Advanced Diploma ☒
Ontario College Graduate Certificate ☐

5. Proposed Program Outcomes:
Please complete and attach the two Program Maps (Appendix A - Form 1 and Form 2)

6. Proposed Program Description:
Please complete and attach the Program Description Form (Appendix B)

7. Proposed Program Curriculum:
Please complete and attach the Program Curriculum Form (Appendix C)

8. Proposed Program Certification/Accreditation:
Please complete and attach the Regulatory Status Form (Appendix D)

9. Date of Submission: May 28, 2014

10. Date of CVS Response: May 28, 2014

11. Validation Decision:
☒ Proposal Validated (APS Number: FANS 01312)

Signed on behalf of CVS: *André Diez de Aux*

Send the completed form and required appendices to: klassen@ocqas.org . For detailed information on how to complete the Application for Program Validation, please refer to the Application Instructions document. For any additional information contact: The Ontario College Quality Assurance Service, 20 Bay Street, Suite 1600, Toronto, ON M5J 2N8; or by telephone at (647) 258-7682.

Ontario College Quality Assurance Service

Service de l'assurance de la qualité des collèges de l'Ontario

ONTARIO COLLEGES OF APPLIED ARTS AND TECHNOLOGY
CREDENTIALS VALIDATION SERVICE
APPENDIX A - PROGRAM MAPS
(Vocational Program Outcomes & Essential Employability Skills Outcomes)

Vocational Program Learning Outcomes:

Form 1 (attached) is provided to assist you in mapping your proposed program vocational learning outcomes against existing vocational outcomes found in either Provincial Program Standards or in Provincial Program Descriptions. When completing this form, please be sure to include the MTCU code (where applicable) for the program category being referenced.

Where there is a relevant Provincial Program Standard, the approved Vocational Learning Outcomes must appear in the first column, followed by your proposed program vocational learning outcomes.

Where there are no Provincial Program Standards, the first column will contain program outcomes from the Provincial Program Description. Again, your proposed program vocational learning outcomes will be added in the middle column.

NOTE: ***Both these types of documents can be obtained from staff at the CVS or at the Colleges Unit, MTCU. Electronic copies of the Program Descriptions can be found at http://caat.edu.gov.on.ca/HTMLpages/Programs while electronic copies of the Provincial Program Standards can be found at http://www.edu.gov.on.ca/eng/general/progstan/index***

If there are no such programs in the province, this information will be provided in the left column. The proposed vocational program outcomes must be written in the middle column.

The last column will contain a list of the relevant curriculum proposed in your program to address the outcome in a manner that ensures the graduate will have reliably demonstrated the required skill or ability. Course numbers or course codes, corresponding to those provided in your list of courses (Appendix C), are sufficient in this column.

Essential Employability Skills Outcomes:

A mapping of the Essential Employability Skills (EES) will be done on Form 2 (attached).

The instructions / requirements for this map are the same as for the Vocational Program Map. The first three columns contain the approved skill categories, the defining skills, and the EES learning outcomes. The last column will contain the proposed curriculum (as listed in Appendix C) that will ensure the meeting of these outcomes.

ONTARIO COLLEGES OF APPLIED ARTS AND TECHNOLOGY
CREDENTIALS VALIDATION SERVICE
APPENDIX A - PROGRAM MAPS
Form 1 - Vocational Program Outcomes

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
1. apply mathematical, physical, and chemical concepts to tasks, such as the analysis and synthesis of chemical compounds and samples and to develop approaches and techniques for the solution of problems.	No change	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 MATH-1172 – Math 1 SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
		BIOL-5003 – Molecular Biology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 ENVR-5005 – Industrial Hygiene
2. conduct and interpret accurately manual* quantitative and qualitative analyses using prescribed laboratory procedures.	No change	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry BIOL-5003 – Molecular Biology PHYS-5001 – Modern Physics CHEM-5005 – Instrumental Methods of Analysis 2

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
3. prepare organic and inorganic compounds using standard synthetic* and purification procedures.	No change	CHEM-1003 – General Chemistry 1 CHEM-1012 – General Chemistry 2 CHEM-3003 – Analytical Chemistry CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry CHEM-5005 – Instrumental Methods of Analysis 2
4. perform statistical calculations to report and evaluate the results of analyses.	No change	CHEM-1003 – General Chemistry 1 SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 PHYS-1001 – Physics CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry PHYS-5001 – Modern Physics

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
		CHEM-5005 – Instrumental Methods of Analysis 2
5. perform instrumental chemical analysis and interpret, evaluate, and report the quantitative/qualitative results.	No change	CHEM-1003 – General Chemistry 1 CHEM-1012 – General Chemistry 2 CHEM-3003 – Analytical Chemistry CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics CHEM-5003 – Quantitative Food Chemistry CHEM-5005 – Instrumental Methods of Analysis 2
6. apply computer skills relevant to the chemical laboratory technology field.	No change	CHEM-1003 – General Chemistry 1 SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics CHEM-3003 – Analytical Chemistry BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
		BIOL-5003 – Molecular Biology BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5005 – Instrumental Methods of Analysis 2
7. maintain and troubleshoot* laboratory equipment according to the manufacturers' guidelines.	No change	CHEM-1003 – General Chemistry 1 BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 CHEM-3003 – Analytical Chemistry BIOL-3003 – Microbiology 2 CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics CHEM-5003 – Quantitative Food Chemistry CHEM-5005 – Instrumental Methods of Analysis 2
8. perform relevant Quality Assurance and Quality Control procedures to ensure that processes remain within designated limits.	No change	BIOL-3001 – Microbiology 1 – Bacteriology CHEM-3004 – Instrumental Methods of Analysis 1 CHEM-5003 – Quantitative Food Chemistry CHEM-5005 – Instrumental Methods of Analysis 2
9. use interpersonal and communication skills to facilitate project management in the chemical laboratory technology environment.	No change	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 Reason and Writing 1 – Technology BIOL-3001 – Microbiology 1 – Bacteriology

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
		CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry BIOL-5003 – Molecular Biology BIOL-3002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
10. ensure that all assigned work is performed in compliance with relevant occupational health, safety, and environmental law, legislation, and regulations; established policies and procedures; and in accordance	10. perform all work in compliance with relevant occupational health, safety, and environmental law, legislation, and regulations; established policies and procedures; and in accordance with ethical principles.	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
with ethical principles.		PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry BIOL-5003 – Molecular Biology BIOL-3002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5005 – Instrumental Methods of Analysis 2 ENVR-5005 – Industrial Hygiene
11. apply problem-solving skills to chemical laboratory technology problems.	No change	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 MATH-1172 – Math 1 BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES (MTCU code 61302)	PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES	COURSE TITLE / COURSE CODE (From Appendix C)
		MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5005 – Instrumental Methods of Analysis 2 ENVR-5005 – Industrial Hygiene
12. develop a plan for continued professional growth.	No change	COOP-1020 – Co-operative Education Employment Prep BIOL-3003 – Microbiology 2

NOTE: Mandatory General Education courses are not mapped to Vocational Learning Outcomes.

ONTARIO COLLEGES OF APPLIED ARTS AND TECHNOLOGY
CREDENTIALS VALIDATION SERVICE
APPENDIX A - PROGRAM MAPS
Form 2 - Essential Employability Skills Outcomes

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
COMMUNICATION	• Reading • Writing • Speaking • Listening • Presenting • Visual Literacy	➢ communicate clearly, concisely, and correctly in the written, spoken, and visual form that fulfils the purpose and meets the needs of the audience	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology MATH-1172 – Math 1 ENVR-1014 – Environmental and Science Issues SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics COOP-1020 – Co-operative Education Employment Prep BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
		➢ respond to written, spoken, or visual messages in a manner that ensures effective communication	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology MATH-1172 – Math 1 ENVR-1014 – Environmental and Science Issues SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics COOP-1020 – Co-operative Education

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			Employment Prep BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
NUMERACY	• Understanding and applying mathematical	➢ execute mathematical operations accurately	CHEM-1003 – General Chemistry 1 MATH-1172 – Math 1 SKLS-1020 – Fundamentals of Science

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
	concepts and reasoning • Analysing and using numerical data • Conceptualizing		CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 PSYC-5011 – Industrial Relations PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 ENVR-5005 – Industrial Hygiene
CRITICAL THINKING & PROBLEM SOLVING	• Analysing • Synthesizing • Evaluating • Decision-making • Creative and innovative thinking	➢ apply a systematic approach to solve problems	CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology MATH-1172 – Math 1 ENVR-1014 – Environmental and Science Issues SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
		➢ use a variety of thinking skills to anticipate and solve problems	CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			MATH-1172 – Math 1 ENVR-1014 – Environmental and Science Issues SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
INFORMATION MANAGEMENT	• Gathering and managing information • Selecting and using appropriate tools and technology for a task or a project • Computer literacy • Internet skills	➢ locate, select, organize, and document information using appropriate technology and information systems	CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology ENVR-1014 – Environmental and Science Issues BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 COOP-1020 – Co-operative Education Employment Prep BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
		➢ analyse, evaluate, and apply relevant information from a variety of sources	CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology ENVR-1014 – Environmental and Science Issues BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 COOP-1020 – Co-operative Education Employment Prep BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
INTER-PERSONAL	• Team work • Relationship management • Conflict resolution • Leadership • Networking	➢ show respect for the diverse opinions, values, belief systems, and contributions of others	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology ENVR-1014 – Environmental and Science Issues BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 COOP-1020 – Co-operative Education Employment Prep BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
		➢ interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology ENVR-1014 – Environmental and Science Issues BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			CHEM-3004 – Instrumental Methods of Analysis 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
PERSONAL	• Managing self • Managing change and being flexible and adaptable • Engaging in reflective practices • Demonstrating personal responsibility	➢ manage the use of time and other resources to complete projects	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 - Technology MATH-1172 – Math 1 ENVR-1014 – Environmental and Science Issues SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics COOP-1020 – Co-operative Education

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			Employment Prep BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene
		➢ take responsibility for one's own actions, decisions, and consequences	BIOL-1016 – Cytology CHEM-1003 – General Chemistry 1 WRIT-1039 – Reason and Writing 1 -

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			Technology MATH-1172 – Math 1 ENVR-1014 – Environmental and Science Issues SKLS-1020 – Fundamentals of Science BIOL-3001 – Microbiology 1 – Bacteriology CHEM-1012 – General Chemistry 2 MATH-3062 – Mathematics 2 PHYS-1001 – Physics BIOL-3010 – Anatomy and Physiology CHEM-3003 – Analytical Chemistry MATH-3030 – Statistics BIOL-3014 – Current Techniques in Plant Agriculture BIOL-3003 – Microbiology 2 CHEM-3002 – Organic Chemistry 2 CHEM-3004 – Instrumental Methods of Analysis 1 MATH-1173 – Calculus 1 PHYS-3003 – Thermodynamics and Optics BIOL-5001 – Biochemistry CHEM-5001 – Organic Chemistry 2 CHEM-5003 – Quantitative Food Chemistry MATH-5017 – Calculus 2 BIOL-5003 – Molecular Biology PSYC-5011 – Industrial Relations BIOL-5002 – Topics in Biotechnology PHYS-5001 – Modern Physics CHEM-5004 – Industrial Chemistry

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	COURSE TITLE / COURSE CODE (From Appendix C)
			CHEM-5005 – Instrumental Methods of Analysis 2 COMM-3005 – Language and Communication Skills 3 ENVR-5005 – Industrial Hygiene

NOTE: Mandatory General Education courses are mapped to Essential Employability Skills Outcomes.

ONTARIO COLLEGES OF APPLIED ARTS AND TECHNOLOGY
CREDENTIALS VALIDATION SERVICE
APPENDIX B - PROGRAM DESCRIPTION

PROGRAM DESCRIPTION: (including occupational areas where it is anticipated graduates will find employment)

Chemical Laboratory Technology – Science Laboratory is a three-year advanced diploma program that provides students with a wide breadth of knowledge in chemistry, biology, physics and mathematics. Emphasis is on the principles and performance of standard laboratory practices, procedures, and techniques for chemical, biological, and physical analyses. In addition, the curriculum explores applied biology and physics and ensures currency through ongoing interaction with industry. Students will apply their skills in Fanshawe's state-of the-art lab facilities and through a co-operative education placement (12 – 16 months).

Graduates are well-prepared for entry-level laboratory technologist positions in quality control, research, or product development environments. Graduates can also transfer credit into Fanshawe's Bachelor of Applied Technology - Biotechnology program or take advantage of articulation agreements granting advanced standing in degree programs at various universities in Canada and abroad.

VOCATIONAL PROGRAM LEARNING OUTCOMES: (vocational program learning outcomes must be consistent with the requirements of the Credentials Framework for the proposed credential)
***The graduate has reliably demonstrated the ability to*:**

1. apply mathematical, physical, and chemical concepts to tasks, such as the analysis and synthesis of chemical compounds and samples and to develop approaches and techniques for the solution of problems.
2. conduct and interpret accurately manual* quantitative and qualitative analyses using prescribed laboratory procedures.
3. prepare organic and inorganic compounds using standard synthetic* and purification procedures.
4. perform statistical calculations to report and evaluate the results of analyses.
5. perform instrumental chemical analysis and interpret, evaluate, and report the quantitative/qualitative results.
6. apply computer skills relevant to the chemical laboratory technology field.
7. maintain and troubleshoot* laboratory equipment according to the manufacturers' guidelines.
8. perform relevant Quality Assurance and Quality Control procedures to ensure that processes remain within designated limits.
9. use interpersonal and communication skills to facilitate project management in the chemical laboratory technology environment.
10. perform all work in compliance with relevant occupational health, safety, and environmental law, legislation, and regulations; established policies and procedures; and in accordance with ethical principles.
11. apply problem-solving skills to chemical laboratory technology problems.
12. develop a plan for continued professional growth.

ADMISSION REQUIREMENTS:

OSSD with courses from the College (C), University (U),
University/College (M), or Open (O) stream WITH:
- Mathematics* ONE OF:
  - Grade 12 Mathematics for College Technology** (C)
  - Grade 11 Functions (U)
  - Grade 11 Functions and Applications (M)

(Note: minimum final grade required is 60)
- Grade 11 or Grade 12 Chemistry (C) or (U)

OR

Academic and Career Entrance Certificate (ACE)*** WITH:
- Core Mathematics

(Note: minimum final grade required is 60)
- Chemistry

OR

Pre-Technology Ontario College Certificate*** AND:
-minimum final grade of 'C' or 60 in the required Mathematics

OR

Ontario High School Equivalency Certificate (GED) AND:
- Mathematics* ONE OF:
  - Grade 12 Mathematics for College Technology** (C)
  - Grade 11 Functions (U)
  - Grade 11 Functions and Applications (M)

(Note: minimum final grade required is 60)
- Grade 11 or Grade 12 Chemistry (C) or (U)

OR

Mature applicant with standing in the required courses and grade stated above

Note:

- *In lieu of Grade 12 Mathematics for College Technology (C) or Grade 11 Mathematics (U) or (M) courses, the following Mathematics courses are acceptable:
  - Grade 12 Advanced Functions (U)
  - Grade 12 Calculus and Vectors (U)
  - Grade 12 Mathematics of Data Management (U)
  - Grade 12 Foundations for College Mathematics (C)

  (Note: minimum final grade required in each course is 60)

- **Grade 12 Mathematics for College Technology (C) preferred.
- Applicants who lack required courses may be admitted to the program subject to appropriate prior

upgrading.

English Language Requirements

Applicants whose first language is not English will be required to demonstrate proficiency in English by one of the following methods:

- A Grade 12 College Stream or University Stream English credit from an Ontario Secondary School, or equivalent, depending on the program's Admission Requirements
- Test of English as a Foreign Language (TOEFL) test with a minimum score of 550 for the paper-based test (PBT), 213 for the computer-based test (CBT), and 79 for the Internet-based test (iBT), with test results within the last two years
- International English Language Testing System (IELTS) test with an overall score of 6.0 with no score less than 5.5 in any of the four bands, with test results within the last two years
- Canadian Academic English Language (CAEL) test with an overall score of 60 with no score less than 50 in any of the four bands, with test results within the last two years
- An English Language Evaluation (ELE) at Fanshawe College with a minimum score of 70% in all sections of the test, with test results within the last two years

Note:

- ***Students admitted to the Fanshawe College Pre-Technology and Academic and Career Entrance Technology stream programs are guaranteed admission the following year to a Technology career program provided that they successfully complete their Pre-Technology Ontario College Certificate or Academic and Career Entrance Certificate and fulfill any other specified conditions. Normally these students are admitted to their first choice program.

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APPENDIX C - PROGRAM CURRICULUM

Semester	Course Code*	Course Title (and brief course description)
1	BIOL-1016	**Cytology** This is an introductory course in biology where the study is limited to basic biological process occurring at the cellular level. The topics discussed will include cell structures and their function, structure and formation of macromolecules; energy procurement, release and utilization; DNA structure and protein synthesis; Mendal's Laws and inherited characteristics; and Genetic diseases and their causes.
1	CHEM-1003	**General Chemistry 1** This course covers the basic concepts of matter, quantitative interpretation of chemical reactions, behaviour of gases, composition of atoms and their electron configurations and chemical bonding. Laboratories provide opportunities to develop laboratory techniques while working on experiments related to theory discussed in lectures.
1	WRIT-1039	**Reason & Writing 1-Technology** This course will introduce technology students to essential principles of reading, writing, and reasoning at the postsecondary level. Students will identify, summarize, analyze, and evaluate multiple short readings and write persuasive response essays to develop their vocabulary, comprehension, grammar, and critical thinking. This course will also introduce students to selected issues and terms in technology.
1	MATH-1172	**Math 1** As the first of two pre-calculus mathematics courses, content covered includes treatment of data, fundamental algebra, radicals and logarithms. Application of problem solving skills, such as the quadratic formula, as related to scientific analysis will be emphasized.
1	ENVR-1014*	**Environmental & Science Issues** This course provides a comprehensive understanding of the parameters and problems surrounding major environmental issues. This understanding will enable the student to evaluate different courses of action that can be undertaken in decision-making practices.
1	SKLS-1020	**Fundamentals of Science** This course introduces the student to basic concepts and skills needed for success in any science of technology field. Emphasis will be given to systems of measurement, basic statistics, data interpretation, and computer applications including MS Word and Excel as applied to laboratory technology.
2	BIOL-3001	**Microbiology 1 - Bacteriology** This is an introductory course in microbiology which places emphasis on bacteriology and will provide the student with a general working knowledge in the following areas: cell structure, taxonomy, cultivation (nutrition, media preparation, isolation, transfer techniques) enumeration, metabolism, control of bacteria, and industrial microbiology.
2	CHEM-1012	**General Chemistry 2** This course introduces students to chemical equilibrium, properties of solutions

Semester	Course Code*	Course Title (and brief course description)
		and acid-base systems, equilibrium in saturated solutions, and oxidation-reduction reactions and associated electrical energy. The laboratory experiments are related to material discussed.
2	MATH-3062	**Mathematics 2** This course is the second of two pre-calculus mathematics courses whose content includes an introduction to trigonometry, treatment of algebraic fractions and functions and graphs. This course introduces the student to the use of a spreadsheet in numerical problem solving.
2	PHYS-1001	**Physics** This foundation course covers kinematics and dynamics of straight line motion, force, work, energy, power, momentum, rotational motion, and properties of fluids. Problem solving involving graphical and numerical techniques will be studied and applied in a laboratory setting. Experimentation results and interpretation of data will be summarized in reports.
2	COOP-1020	**Co-operative Education Employment Prep** This workshop will provide an overview of the roles and responsibilities of the Co-operative Education Students and the Co-operative Education Consultants as well as the Co-operative Education policy. It will provide students with employment preparatory skills specifically related to Co-operative Education works assignments and will prepare students for a Co-operative Education work assignment.
2	GEN ED*	**Elective**
3	BIOL-3010	**Anatomy & Physiology** The content in this course will provide the student with a basic understanding of the anatomical and physiological features in animals and plant growth and development. Students will perform qualitative and quantitative analyses of animal and plant samples following established protocols. This course includes experimental design and the application of management skills required for group work.
3	CHEM-3003	**Analytical Chemistry** The chemical theory and experimentation introduced in general chemistry is developed further with emphasis on laboratory skills and analysis techniques. CHEM3003 demonstrates the importance of stoichiometric calculations for solution preparation, standardization, acid-base reactions, and oxidation-reduction reactions to the analysis of materials applicable to the science and environmental laboratory field.
3	MATH-3030	**Statistics** The course is a fundamental statistics course for technologists and introduces: descriptive statistics; probability and probability distributions; sampling distributions and hypothesis testing; regression and correlation. Students will perform statistical calculations and evaluate the results.
3	BIOL-3014	**BIOL-3014 - Current Techniques in Plant Agriculture** This course will further develop and apply lab skills and techniques in a project based approach using experimental research. The course addresses current industry needs in the area of food, agriculture and research. The topics expand on the study of plants as related to agriculture.

Semester	Course Code*	Course Title (and brief course description)
3	GEN ED*	Elective
4	BIOL-3003	**Microbiology 2** The course introduces the student to an understanding of structural characteristics and taxonomic relationship of major classes of fungi. Emphasis is given to the harmful and beneficial effects of some of the widely distributed species primary and secondary metabolities of fungi sexual and parasexual recombination, detection of mycotoxins in food, fungi and single cell protein (SCP); and mycoses.
4	CHEM-3002	**Organic Chemistry 1** This is a lecture/laboratory course. The lectures will provide students with a basic knowledge of the properties and reactions of alkanes, alkenes, alkynes and aromatic compounds. The Laboratory experiments will emphasize proper techniques in extraction, isolation, purification, identification and synthesis of simple organic compounds.
4	CHEM-3004	**Instrumental Methods of Analysis 1** This course provides students with a knowledge of concepts and techniques employed in spectrophotometric and separation analysis in biological, chemical, environmental, forensic, medical and quality control areas. Practical experience is gained in the operation of infrared, ultraviolet/visible and atomic absorption spectrophotometers, gas and liquid chromatographs.
4	MATH-1173	**Calculus 1** This course is an introduction to differential and integral Calculus of polynomial style functions. Unit 1: limits and derivatives; Unit 2: applications of the derivative; Unit 3: integration and applications. Topics from numerical methods using EXCEL spreadsheets will be incorporated where applicable.
4	PHYS-3003	**Thermodynamics & Optics** This course covers the basic concepts of thermodynamics and optics, and applications to instrumentation the student will encounter in the future. Students will gain experience with the operation of common lab instruments such as the microscope and spectrophotometers. Both the theoretical and practical applications of optical instruments will be covered.
5	BIOL-5001	**Biochemistry** This is an introductory biochemistry course placing emphasis on the study of biochemical structure and formation of carbohydrates, amino acids, protein, nucleic acids, enzymes and metabolism of macromolecules. The laboratory techniques include thin layer chromatography, some protein purification, separation of proteins and nucleic acids (DNA) by electrophoresis.
5	CHEM-5001	**Organic Chemistry 2** This is a Lecture/Laboratory course. It provides students with information on more Functional group studies which include nomenclature, reaction and properties of alcohols, phenols, ethers, halides, aldehydes and ketones, carboxylic acids and derivatives, and nitrogen bases. Stereochemistry topics will be introduced. Laboratory experiments will emphasize the lecture topics.
5	CHEM-5003	**Quantitative Food Chemistry** This course deals with sampling, sample preparation, analysis, calculations, treatment of experimental data, errors, reporting of results, chemistry of chemical procedures for determination of proteins, moisture, minerals, vitamins, and the

Semester	Course Code*	Course Title (and brief course description)
		extraction and analysis of fats and oils.
5	MATH-5017	**Calculus 2** Derivatives of transcendental functions and applications, numerical methods using Maclaurin and Taylor series, integrals of transcendental functions and applications, numerical methods using Simpson's 1/3 rule, solving first-order differential equations and applications, numerical methods using Euler 1st and 2nd order.
5	BIOL-5003	**BIOL-5003 - Molecular Biology** This course provides advanced studies of molecular biology. The students will be performing molecular cloning and analyzing DNA sequencing results. Emphasis will be placed on the techniques and protocols in a molecular biology laboratory environment.
5	PSYC-5011*	**Industrial Relations** When we think of our dream jobs, we often think of the pay cheques and the sense of fulfillment we will receive from doing something we truly enjoy. The terms unions, collective agreements, labour disputes, strikes, and lockouts do not typically appear in that dream. However, these things are also important aspects of work, and they are often misunderstood! This course takes students on a journey through the interdisciplinary field of industrial relations. On this journey students analyze and propose solutions to problems that arise in the Canadian work environment. Students also discuss employment legislation, unionization, the resolution of labour disputes and several other important work related issues. This course enables the student to develop a practical understanding of the Canadian industrial relations system and the principles of behaviour in the industrial working environment.
6	BIOL-5002	**Topics in Biotechnology** This course discusses the basic principles of recombinant DNA technology and its relevance to many of the areas of biotechnology including industrial processes, transgenic animals, genetically modified crops, gene and drug therapy and stem cell applications. The bioethical implications on legal, social and ethical mores will be addressed.
6	PHYS-5001	**PHYS-5001 - Modern Physics** This course introduces the student to fundamental concepts in atomic, nuclear, and radiation physics and to the application of these concepts to laboratory work. Nuclear radiation will be studied on the qualitative and quantitative levels. The hazards of radioactive materials and ionizing radiation will be discussed in terms of established policies and procedures.
5	CHEM-5004	**Industrial Chemistry** A course introducing terminology, processes, economics, calculations associated with industrial scale chemical production (both inorganic and organic) is given to prepare the graduate for an industrial environment. Students will communicate their investigation of industrial chemicals in a presentation format.
6	CHEM-5005	**Instrumental Methods of Analysis 2** This is a lecture/laboratory course. It covers advanced theory topics dealing with concepts and techniques employed in spectrophotometric and chromatographic separation applications, provides an overview of sample preparation and extraction technologies, and an introduction to mass spectrometry. Portable

Semester	Course Code*	Course Title (and brief course description)
		spectroscopic and chromatographic instrumentation for process analytical technology and environmental field sampling applications are also discussed. Practical experience is gained in the operation of infrared (IR) and atomic absorption spectrometers (AA), gas (GC) and liquid chromatographs (HPLC), and gas chromatography/mass spectrometers (GC/MS) and fluorometer.
6	COMM-3005	**COMM-3005 - Language & Communication Skills 3** This course will permit the student to perform primary and secondary research, to shape, organize and document a formal report and to present a persuasive oral proposal.
6	ENVR-5005	**Industrial Hygiene** This course is an introduction to the field of industrial hygiene for students who will be responsible for identifying hazards in their work environment. The ability to recognize and evaluate hazards in the workplace will allow the student to make recommendations for work place decision making processes.

*** General Education**

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APPENDIX D – REGULATORY STATUS FORM
MANDATORY REGULATORY REQUIREMENTS

Where licensing or certification is ***required by legislation*** for entry to practice in the profession or trade, the Ministry of Training, Colleges and Universities requires that colleges ensure that their programs will meet the requirements of the regulatory body in order to be approved for funding.

☐ There is a legislative requirement that program graduates must be certified or licensed by a regulatory authority to practice or work in the occupation.

Name of regulatory authority_____

☐ **(A*)** The program has been accredited or approved by the regulatory authority or its identified third party?

OR

☐ **(B*)** The college is working toward accreditation with the regulatory authority.

Status of application and expected date of achievement_____

☐ **(C*)** If the regulatory authority does not accredit educational programs directly or by an identified third party, has it formally acknowledged (e.g. in its published or legislated registration requirements) that the program graduates will be eligible to write any required certifying or registration exam or that the program is otherwise recognized for the purposes of certifying or registering a graduate?

***Please submit an acknowledgement and/or evidence from the regulatory authority to support (a) or (b) or (c) above.**

VOLUNTARY REQUIREMENTS

Colleges may choose to have a program accredited or recognized by a voluntary membership organization or association. Graduate eligibility for association recognition or adherence to standards imposed by the body is ***not a requirement*** for program funding approval by the Ministry of Training, Colleges and Universities.

Recognition of the program by a voluntary professional body:

☐ Is being sought: Name of professional body: _____

☐ The college is working toward recognition.
Status of application and expected date of achievement: _____

☐ Recognition has been received.
Type of recognition (e.g. accreditation, graduates eligible to write membership exams, etc.):_____

★ **Please submit an acknowledgement and/or evidence from the voluntary association that recognition has been received.**

☒ Recognition is not being sought *(please note there may be titling implications for programs that are not compliant in an area where other existing programs are*).