Canadian Board of Examiners for Professional Surveyors
Conseil canadien des examinateurs pour les arpenteurs-géomètres

Exemption Request Form
(non-accredited, non-recognized program)

DATE:_____NAME:_____

Note: this form is to be filled out by individuals who graduated from non-accredited or non-recognized[1] learning institutions and must be sent with the CBEPS candidate application form. This form and supporting documentation must be provided in digital pdf format on a DVD or CD. Alternately all pdf files can be provided in a zipped folder and sent via email. Foreign trained professionals have a separate process that can be viewed here https://ftls.cbeps-cceag.ca/.

Please provide the following information for each subject for which you believe you should be awarded an exemption:

1. An official transcript of marks (official copy mailed directly to the CBEPS Registrar via email or post).
2. Detailed course description of material covered in each course during the year taken, together with a breakdown of the number of hours spent on each major part.
3. With number of hours in the academic term that were reserved for (a) classes and (b) lab assignments.
4. List of prerequisite courses for each course~~?.~~
5. Copies of the examinations written for this subject (sent directly to CBEPS from the learning institution)
6. Copies of assignments during the course.

In respect to items 5 and 6, if you no longer have these documents, obtain current copies of exam questionnaires and assignments from your learning institution with indication that the course is equivalent to the course taken by the candidate. This documentation should be organized in a way that assessors will have the necessary information easily accessible for each subject always in a digital format. The use of folders identified by subject numbers (Ex. C1) is strongly recommended. Incomplete or disorganized submissions will not be considered by the CBEPS Candidate Evaluation Committee and the applicant will be notified.

[1] The following university geomatics programs have been accredited by CBEPS : University of New Brunswick and University of Calgary. The following college geomatics programs have been recognized by CBEPS: BCIT, NAIT, Red River, COGS and CAN.

Appendix: CANDIDATE COURSES COMPARED TO CBEPS SYLLABUS

Provided by Institution_____, Department of _____,

Date:_____.

For each syllabus topic list the course(s) having equivalent content. Refer to the CBEPS syllabus at https://cbeps-cceag.ca/resources/learning-outcomes-and-study-guides/ for the complete description of learning outcomes.

Be as specific as possible. If you are using a course number or assignments or exams as equivalent contents, please refer to the exact document included also. This will facilitate and speed up the review of your request.

C1 MATHEMATICS			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each[2]		
1. Functions, continuity and limits			
2. Differentiation and applications			
3. Integration, quadratures and applications			
4. Plane curves, tangency and curvature			
5. Sequences, series and Taylor expansions			
6. Partial differentiation and differential operators:			
7. Multiple integrals and numerical approximations			
8. Vector operations and analytical geometry			
9. First and second order linear differential equations and solutions			
10. Introduction to matrix algebra, linear equations and transformations			
11. Complex variables, linear spaces and subspaces			
12. Quadratic forms, orthogonal and unitary matrices			
13. Spherical geometry and trigonometry			

[2] Example: GEOM 3645, file A, page 10

C2 LEAST-SQUARES ESTIMATION AND DATA ANALYSIS			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Apply Knowledge of matrix theory, statistics and estimation.			
2. Analyze measurement errors and modelling, perform random error propagation and preanalysis of survey measurements.			
3. Formulate least squares adjustment problems.			
4. Adjustment equations of different cases, least square adjustment for geomatics problems such as levelling, traverse, triangulation and trilateration networks.			
5. Assess quality of the adjustment solutions.			
6. Perform statistical tests on mean and variance to detect and identify outliers in observations.			

C 3: ADVANCED SURVEYING			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. The concept of precision as it relates to surveying processes			
2. The concept of accuracy as it relates to surveying processes			
3. Procedures and quality assurance measures			
4. The appropriate combination of equipment and procedures for a data gathering task			
5. Translate specifications such as maximum allowable misclosures [angular or linear] into a choice of equipment and procedures			
6. Compose specifications and requirements [standards and quality assurance procedures] for gathering survey related data			
7. Differentiate between the processes that result in position information and the processes that require repeated positioning for local deformation monitoring			
8. The implication of repeated measurements for long-term monitoring with respect to systematic and random influences on the measurement systems			

C 4: COORDINATE SYSTEMS AND MAP PROJECTIONS			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Celestial sphere and its main coordinate systems (Horizon, Right Ascension, Hour Angle, and Ecliptic)			
2. Time systems (sidereal, apparent and universal)			
3. Earth-fixed coordinate systems (natural coordinate system and ellipsoidal coordinate system)			
4. Elements of celestial inertial coordinate system			
5. Orbital coordinate system			
6. Spatial reference systems and spatial reference frames			
7. Principles of map projections (including introductory principles of derivation to enable critiquing of software output)			
8. Characteristics of the Mercator projection			
9. Characteristics of the Transverse Mercator Projection			
10. Characteristics of the Stereographic Double Projection			
11. Characteristics of the Lambert Conformal Conic projection			

C 5: GEOSPATIAL INFORMATION SYSTEMS			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Concepts, principles, techniques and applications that are fundamental to GIS			
2. Nature and characteristics of geospatial data, data representations, methods of data input and editing, and data organization/ management in GIS.			
3. GIS concepts, principles and techniques to real-world spatial problem solving and mapping applications.			
4. Different GIS data collection approaches and data sources that require the knowledge of data quality . . .			
5. Implementation procedures and GIS development strategies that follow the general principles of business modeling . . .			
6. Developments on web-based mapping services and GIS for better geospatial information dissemination			

C 6: GEODETIC POSITIONING			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each		
1. Physical aspects of geodetic positioning (concept of the Earth's gravity field and how it affects coordinate systems and observations, deflections of the vertical and geopotential numbers)			
2. Space reference systems (establishment of a classical horizontal and vertical datums, modern 3D datums, evolution of datums in Canada : NAD27 – NAD83 – NAD83(CSRS) and the transformation between these datums, relationship between NAD83(CSRS) and the different ITRFs and the transformation between these different 3D coordinate systems, effect of tectonic plates on coordinates, underlying principle of the upcoming new Canadian vertical datum and the differences compared to the existing one)			
3. Computation of coordinates (Identify and select the appropriate coordinate system, reduce terrestrial observations, and coordinate transformation)			
4. Time scales and astronomy (different time scales, determination of astronomical latitude and longitude, determination of astronomical azimuth and make observations)			
5. GPS and other GNSS (complications of electromagnetic wave propagation, concepts and the constituents of a GNSS, signal structure of GPS, different types of GPS observations, pseudo-range, and phase observables, different positioning modes (absolute, differential, RTK, PPP), error sources and achievable accuracy, design of a GPS survey and recent developments)			

C 7: REMOTE SENSING AND PHOTOGRAMMETRY			
Syllabus topic **(refer to CBEPS syllabus for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Ability to explain and illustrate the role of remote sensing and photogrammetry in mapping applications			
2. Ability to work in a basic fashion with remote sensing imagery			
3. Ability to apply concepts and principles of determining spatial positions using photogrammetric techniques			
4. Mission planning for airborne sensing operations			
5. Assess geo-referencing data acquired with tools such as GPS and inertial technologies			
6. Assess the quality of different rectification methodologies (e.g. ortho-rectification, polynomial rectification)			
7. The concept of electromagnetic radiation and how it interacts with matter			
8. Infer valid information from remote observations			
9. Apply the principles, techniques, and practice of the quantitative analysis of digital imagery			
10. Demonstrate an understanding of remote sensing technologies and their spatial and temporal sampling characteristics			
11. Relate observations to models (mathematical, computational, and conceptual) of photogrammetric data			
12. Apply the concepts and principles of determining spatial positions using photogrammetric techniques			

C 8: CADASTRAL STUDIES			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Concept of real property (in Common Law jurisdictions and in Quebec)			
2. Transferring rights to real property			
3. Different land registration systems in use in Canada			
4. Link between land registration systems and boundaries			
5. Different forms of descriptions of land			
6. Link between the land surveyor and the law of real property			
7. Role of the land surveyor in the processes of subdivision, transfer of land			
8. Concept of boundary, including natural and artificial boundaries			
9. Processes by which a boundary may move including adverse possession, estoppel, conventional line agreements, water boundaries			
10. Adverse possession, colour of title and prescription			
11. Various survey systems in Canada			
12. Maritime zones identified in the United Nations Convention of the Law of the Sea and the Oceans Act			
13. Maritime boundaries			
14. Relationship between the cadastre and the land registration process. FIG Statement on the Cadastre			
15. Potential liability of a land surveyor under the laws of negligence and under the standards of professional regulation			
16. Aboriginal title and other Aboriginal claims to land in Canada. Development of Aboriginal land claims			
17. Principles found in case law and statutes and regulations to land surveying.			

C 9: SURVEY LAW			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column) Provide your pdf file name and page number for each..		
1. Basis of the Canadian legal system and how it is affected by case law and precedent			
2. Federal and Provincial statutes, the Common Law and the Civil Law in Quebec as they affect property rights and cadastral surveys			
3. Limitations of actions and estoppel			
4. Principles and admissibility of evidence including the role of an expert			
5. Road dedication, easements, rights of way, statutory rights of way.			
6. Adverse possession, prescription . . .			
7. Grants, reservations, transfers through deeds and other land related documents			
8. Water boundaries, accretion and erosion, principles of apportionment, how property rights are affected by the ambulatory nature of water bodies and related case law.			
9. Riparian and littoral rights and how they have been affected by modern statutes.			
10. Classification of waters, offshore boundaries and zones, tenures over bodies of water, at sea, jurisdiction over the offshore, navigability			
11. Various types of boundaries, their creation and demarcation, descriptions, retracement and reposting, and the hierarchy of evidence.			
12. Ways of resolving boundary uncertainties, including mediation, litigation, statutory confirmation, bornage, land surveyor's role in each.			
13. The role of a surveyor as a member of a self-governing profession and its benefits and obligations.			
14. Historical and modern case law relating to all of the above.			

C 10: LAND USE PLANNING AND THE ECONOMICS OF LAND DEVELOPMENT			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. General knowledge of land use planning and utilization.			
2. Evolution of land settlement patterns in the various regions of Canada [the Atlantic provinces, Québec, Ontario, the Western provinces, the Territories].			
3. Legal and policy environments for regional, municipal and site-specific planning.			
4. Purpose of regional plans, official community plans and zoning legislation and the role of the public and other stakeholders in planning processes.			
5. Design criteria necessary to undertake a land development design project			
6. How special features and values in an urban community can be protected by building restrictions			
7. Factors which have to be considered in community design in cold climates			
8. Contemporary planning design strategies			
9. Economics of land development.			

C 11: BUSINESS PRACTICE AND THE PROFESSION			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Business basics such as: contract components, etc			
2. Business fundamentals such as: the business plan, etc.			
3. Business essentials such as: capitalization, etc.			
4. Risk management:			
5. Reasons behind the regulation of professions in Canada.			
6. Attributes of self-governing professions in Canada			
7. Self-regulating surveying associations in Canada			
8. Major components of a professional code of ethics			
9. Name and compare various types of code of ethics			
10. Process of complaint and discipline and differentiate between the two.			
11. What constitutes standards of practice			
12. Main elements of standards of practice.			
13. Continuing Professional Development.			
14. Why a self-regulated profession may have a Continuing Professional Development program			

C 12: HYDROGRAPHIC SURVEYING			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Underwater Acoustics (Acoustic Velocity, Sound Wave Propagation and Acoustic System Parameters)			
2. Single-beam Echosounders (Transducers, Data Recording, Sounder Calibration, Sounding Reduction, Sounding Accuracy, System Selection and Equipment Evaluation)			
3. Multibeam Echo Sounder (Multibeam Transducers, Coverage and Accuracy, MBES Calibration, Importance of Time, Importance of Motion, MBES Data Management and Equipment Evaluation)			
4. Side Scan Sonar (Side Scan Sonar Systems, Side Scan Sonar Data Interpretation, System Selection, SSS vs MBES and Equipment Evaluation)			
5. Tide and Non-Tidal Water Levels (Tidal Fundamentals, Tidal Measurements, Tidal Streams and Currents, Tidal Information and Non-Tidal Water Level Variations)			
6. Vertical Positioning (Previous Datums, Vertical Datum Fundamentals, Datums, Elevation Measurements and Computations, Heave and Orientation)			
7. Understanding of Principles and Technology (Instrumentation, Operations and Survey Data Processing)			
8. Hydrographic Surveys (Surveys in Support of River Crossings and Engineering, Surveys in Support of Port Management and Coastal Engineering and Nautical Charting)			

E 1: SPATIAL DATABASES AND LAND INFORMATION SYSTEMS			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Describe and give examples of: a. data, geospatial data, metadata, b. databases, geospatial databases, c. database management systems . . .			
2. Similarities and differences between categories of databases			
3. Major phases of formal methods such as IBM Rational Unified Process (RUP) . . .			
4. Organizational and institutional issues affecting the success of geospatial database and LIS projects			
5. Appropriate modeling languages (ex. E/R, UML) to design geospatial database models.			
6. Suggest improvements to a database structure to perform given queries, to optimize given queries, to increase data quality and to reduce redundancy and data inconsistency.			
7. Name ISO TC/211standards and OGC standards related to topics listed in learning outcome			
8. Apply spatial database concepts in a Land Information System context.			

E 2: ADVANCED HYDROGRAPHIC SURVEYING			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics. (List the most important course in the first column). Provide your pdf file name and page number for each.		
1.Background and the Natural Environment (Historical Context and Marine Environment Introduction)			
2. Underwater Acoustics (Acoustic Fundamentals, Acoustic Velocity, Sound Wave Propagation, Ray Tracing, Reflection and Scattering of Acoustic Waves and Acoustic Noise and the Directivity Index)			
3. Single Beam Echo Sounders (Transducers, Data Recording and Equipment Evaluation)			
4. Multibeam Echo Sounder (Multibeam Transducers, Coverage and Accuracy, Object Detection, Backscatter and Equipment Evaluation)			
5. Phase Differencing Bathymetry (Interferometry) (Phase Differencing Systems, Deployment and Mounting and Equipment Evaluation)			
6. Side Scan Sonar (SSS vs MBES and Equipment Evaluation)			
7. Sub Bottom Profiler (Sub Bottom Profiler Systems, Sub Bottom Profiler Data Interpretation, System Selection and Equipment Evaluation)			
8. Marine Magnetometer (Marine Magnetometer Systems, Marine Magnetometer Data Interpretation, System Selection and Equipment Evaluation)			
9. Tide and Non-Tidal Water Levels (Tidal Fundamentals, Tidal Analysis and Prediction)			
10. Surface Positioning			
11. Acoustic Positioning (Acoustic Devices, Acoustic Positioning Systems, Deployment and Calibration and Error Sources and Accuracy)			
12. Hydrometric Surveys (Streams and Rivers) (Hydrometric Surveys and Water Sampling)			
13. Other Techniques (Laser Bathymetry, LiDAR Bathymetry, Remote Sensing Bathymetry, Mechanical Techniques and Other Data Capture)			

14. Meteorology (The Atmosphere, Meteorological Elements, Winds, Climatology and Weather Systems)			
15. Oceanography (Physical Properties of Sea Water, Marine Circulation Dynamics, General Circulation of the Oceans, Wind Waves and Swell, Wave Propagation, Oceanographic Measurements and Oceanographic Instruments)			
16. Marine Geology and Geophysics (Marine Geology, Seismic Profiling, Geotechnical Sampling, Deposition and Erosion and Environmental Impact)			
17. Data Management (Real-Time Data Acquisition and Control, Analogue Data Capture, Approximation and Estimation, Spatial Data Processing and Analysis, Visualisation and Presentation, Chart and Marine Cartography and Electronic Charts)			
18. Hydrographic and Offshore Surveys (Flood Plain Mapping, Nautical Charting, Drilling Support, Marine Seismic, Site, Hazard and Environmental Surveys, Pipeline Lay and Rectification Work, Structure Emplacement and Platform Decommissioning)			
19. Hydrographic Survey Legal Aspects (Product Liability, Rivers and Lakes, Law of the Sea Development, Near Shore and Offshore, Marine Law and Marine Cadastre)			

E 3: ENVIRONMENTAL MANAGEMENT			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Jurisdiction and role of federal/provincial/territorial/municipal agencies for major land use activities.			
2. role, including critical triggers, for key federal legislation [Canadian Environmental Assessment Act (CEAA), Canadian Environmental Protection Act (CEPA), Fisheries Act and Migratory Birds Convention Act] and provincial/territorial legislation.			
3. Mitigative techniques employed to address critical wildlife habitat, archaeological sensitivities, . . .			
4. Protective techniques for bulk fuel storage and handling, stream and bank protection			
5. Techniques for land use operation and construction in permafrost conditions . . .			
6. Terms [their meaning and relevance to land development]: ecosystems, ecology. . .			

E 4: ADVANCED REMOTE SENSING			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Physics and principles of remote sensing			
2. Principles and the mathematics of radiometric corrections of remote sensing data			
3. Principles and the mathematics of geometric corrections to collected imagery			
4. Principles and apply image classification techniques as well as evaluation of the classification results			
5. Principles and data processing techniques of thermal and multi/hyper-spectral scanning			
6. Principles and apply digital imaging processing techniques including image enhancement			
7. Principles and operational characteristics of microwave remote sensing			
8. Principles of LiDAR mapping (e.g., laser principles, error sources and their impact, and data processing)			
9. Application of remote sensing for vegetation, water, and urban landscape monitoring			
10. Multi-temporal remote sensing data for change detection			

E 5: ADVANCED PHOTOGRAMMETRY			
Syllabus topic **(refer to CBEPS syllabus item for complete description)**	List of courses (number and name) having equivalent content to syllabus topics (List the most important course in the first column). Provide your pdf file name and page number for each.		
1. Pre-mission factors that might affect the quality of photogrammetric products and post-mission measures for evaluating the quality of the delivered product.			
2. Differentiate between the mechanisms and the sensor modeling alternatives of photogrammetric data acquisition modalities			
3. Conceptual basis and the implementation details of the various mathematical models for relating image and ground coordinates.			
4. Differences between the various image geo-referencing techniques and their impact on the quality of the final product			
5. Conceptual basics and implementation of image matching techniques			
6. Differentiate between image ortho-rectification techniques			
7. Principles of LiDAR mapping			