ABCPF ACADEMIC STANDARDS

1. Biometry
2. Dendrology
3. Electronic Data Processing
4. Fire Management
5. Forest Ecology *(ABCPF Academic Standard for this course is currently unavailable due to updates)*
6. Forest Economics
7. Forest Entomology
8. Forest Harvesting
9. Forest Hydrology
10. Forest Land Management
11. Forest Mensuration
12. Forest Pathology
13. Forest Soils
14. Forest Surveying
15. Forest Transportation Systems
16. Industrial Forest Management
17. Integrated Resource Management
18. Manufacture of Wood Products
19. Material Properties of Wood
20. Oral Communications

21. Principles of Biology *(ABCPF Academic Standard for this course is currently unavailable due to updates)*

22. Professional Report *(ABCPF Academic Standard for this course is currently unavailable due to updates)*

23. Remote Sensing & Photo Interpretation

24. Silvics

25. Silviculture

26. Technical Report Writing

ABCPF BIOMETRY ACADEMIC STANDARD

August, 1995

Scope:

Statistics is a necessary tool for the practicing forester and is frequently applied to decision-making processes. The forestry profession requires continual updating of knowledge and in order to keep abreast, a sound statistical basis is required for proper understanding of literature and scientific reports.

Objectives:

1. To acquire a working knowledge of basic statistical tools necessary for everyday forestry practices.

2. To acquire an understanding of biometrics necessary for the proper interpretation of statistical analyses found in technical and scientific reports.

3. To be able to identify problems requiring statistical expertise and be able to communicate these problems to a biometrician.

Key Attributes:

The candidate must have an understanding of the following components of biometrics and an awareness of their use:

1. Measures of central tendency, spread and grouped data (descriptive statistics).

2. Theory of probability (counting; laws of probability; probability distributions: normal and binomial).

3. Sampling theory (central limit theorem; sampling distributions of means, proportions, differences of means, variances, ratios of variances).

4. Confidence limits (for means, proportions, differences of means, variances, ratios of variances).

5. Tests of hypotheses (Z-and t-tests for means and proportions; chi-square test for goodness of fit, variances, and contingency tables; F-test for two variances).

6. Introduction to design of experiments and analysis of variance (replication, error control, completely random, randomized complete block design: one-way, two-way ANOVA: assumptions; components of variance; test of homogeneity of variances principles of F-test in ANOVA).

7. Simple linear regression (least squares theorem; correlation; coefficient of determination; mathematical model; confidence limits; testing of hypotheses concerning regression coefficients; lack of fit).

The candidate must have an awareness of the use of the following components of biometrics:

1. Uniform, hypergeometric, geometric, negative binomial, and Poisson distributions.

2. Multiple regression and curve fitting.

3. Non-parametric statistical tests.

ABCPF DENDROLOGY ACADEMIC STANDARD

August, 1995

Scope:

Dendrology is the study of tree form and function. All professional foresters must know how and where trees grow, be able to identify and describe the trees they work with, and understand their usefulness to humans. Basic scientific knowledge about trees is a foundation for other topics such as forest ecology, silvics, silviculture, wood anatomy, mensuration, harvesting and forest land management. Candidates may cover the subject matter of Dendrology as part of a broader survey of the plant kingdom (e.g. Plant Taxonomy), but there must be considerable instructional time devoted specifically to trees and how they differ from other plant life forms.

Objectives:

Candidates who wish to become a professional forester should be able to:

1. Describe and contrast the life cycle and general growth and development characteristics of major tree groups (e.g. gymnosperms vs angiosperms; 2-3 needle (hard) pine vs 5-needle (soft) pine, deciduous vs evergreen angiosperms; monocots vs dicots);

2. Identify and describe all major species of coniferous and deciduous trees in British Columbia;

3. Identify other important or interesting (e.g. evolutionarily significant, biggest, historically interesting) tree species or genera found within Canada, the Northern Hemisphere, and/or worldwide; and

4. Develop and use a dichotomous key for tree species identification using reproductive and vegetative characteristics.

Key Attributes

Knowledge of the following components is required:

1. Life cycle, tree function and general growth and development (includes basic anatomy and physiology - water relations, photosynthesis, respiration, stem and root growth, phenology, sexual and vegetative reproduction);

2. Geographic range and general habitat characteristics;

3. Scientific and common names;

4. Position in the botanical heirarchy, including taxonomic relationships to other tree species;

5. Morphological characteristics (size, form, bark, twigs, leaves, flowers, fruit, seeds, roots); and

6. Commercial and other values (wood, fibre, chemicals, food, medicines, environmental, cultural)

ABCPF ELECTRONIC DATA PROCESSING ACADEMIC STANDARD

August, 1995

Scope:

Data processing techniques are being used at all levels of forest management. A general understanding of this subject is essential to the professional forester.

Objectives:

Candidates who wish to become a professional forester should be able to:

1. Acquire the basic concepts of data processing.

2. Learn and understand basic programming techniques using a high level computer language.

3. Demonstrate the acquired programming knowledge by developing simple application programs.

4. Understand the principles of data base management.

Key Attributes

Understanding of the following components are important for the candidate to acquire a proper grasp of this subject area:

1. Introduction to the function and structure of computer systems:
   Hardware: input-output devices, the cpu, memory units, etc.
   Introduction to the concept of an operating system.

2. Basic programming techniques:
   Introduction to programming: problem analysis.
   Assignment statements and variables; evalutaion of expressions, input-output and assignment statements.
   Mixed mode arithmetic.
   Control statements; conditional branching (IF THEN, GO TO, STOP).
   Program loop instructions; DO LOOP statements and their general use; introduction to nested loops.
   Subscribed variables; one and two dimensional arrays.
   Sub-programs: SUBROUTINES, FUNCTIONS, the CALL statement.

3. Acquire a basic understanding of some basic data management systems and data simulation models.

4. Demonstrate the acquired program knowledge by developing a simple application program.

5. Provide overview of the most appropriate models used in forest management for modeling yield, stand dynamics and volume control.

ABCPF FIRE MANAGEMENT ACADEMIC STANDARD

August, 1995

Scope:

Wildfires and prescribed fires have influenced and will continue to influence the well-being of British Columbians and their environment. Understanding the ecological role of fire and its cost-effective management through control or wise use is an essential requirement of every professional forester. This includes an understanding of physics, chemistry, history, fire behavior, weather, ecology, planning, prevention, suppression, and detection. Also included are areas such as danger rating systems, prescribed burning, and the social, political, and operational context of the delivery of fire management.

Objectives:

To provide an understanding of fire management practices in the context of land management objectives including silviculture, timber production, range, wildlife, recreation, public safety, and environmental quality. Candidates to become a professional forester should have:

1. A working knowledge of fire behavior and ecology to understand how fire influences and determines forest stand dynamics, landscape patterns, and biodiversity, as well as, how fire management activities have affected the role of fire on forest and range lands;

2. An understanding of fire management systems and practices including legislation, policy, and enforcement;

3. Some experience in the development of fire management plans, use of fire behavior prediction models, and planning suppression actions for individual wildfires; and

4. A working knowledge of the application of prescribed fire including planning and execution.

Key Attributes:

Understanding of the following components are important for the candidate to acquire a proper grasp of this subject area:

1. The role and context of modern fire management including:
   Eological role of wildland fire;
   evolution of fire management; and
   integration with resource and environmental management;

2. The role of fire as an integral part of ecosystem function and landscape ecology;

3. Basics of chemistry and physics of fuel condition and combustion;

4. Factors that influence fire initiation, spread, and intensity, including models developed to predict fire potential, behavior, and growth;

5. Fire weather and behavior including basic fire meteorology, stages of fire behavior, fire environment, extreme fire behavior, and fire weather interpretation and forecasts;

6. Danger rating systems and theory;

7. Fire prevention (including fuels management), detection (planning and scheduling), and suppression systems and equipment;

8. Fire management organization and operations approach andb structures;

9. Fire use including planned versus "natural" prescribed fires (objective development, wilderness fire management, planning and execution, smoke management); and

10. Understanding of the social, political and operational context of delivery of fire management components and the necessary legislation, policy and research and development to ensure effectiveness and efficiency (least cost+loss and net-value-change theories, methods of evaluating effectiveness, legislation, policy, special problems such as interface fires, public safety and evacuation, media relations).

ABCPF FOREST ECONOMICS ACADEMIC STANDARD

August, 1995

Scope:

Forest economics is concerned with how to allocate forest resources among competing uses and combine them with other resources (labour and capital) in order to meet the needs of individuals, groups and society at large most effectively. Professional foresters should have a good understanding of economic principles and how they bear on the production, distribution and consumption of the varied products, both timber and non-timber, produced by forests.

Objectives:

Candidates to become professional forester should have:

1. An appreciation of forest management as an economic activity.

2. An understanding of the basic economic principles that shape and determine the outcomes of forest policies and forest management strategies.

3. An ability to apply the concepts and tools of economic analysis to decisions concerning the management of forest resources.

Key Attributes

An understanding of the following components are essential for the candidate to acquire an adequate grasp of this subject area:

1. The role and limitations of economics in decision making in forestry.

2. The concepts of economic efficiency and marginal analysis.

3. Efficiency through market processes; market failures and public interventions.

4. Economic efficiency over time, capital theory, investment analysis and capital budgeting.

5. Economic factors affecting the demand for and supply of forest products.

6. The role of economics in timber supply planning including the optimum forest rotation and the allocation of timber harvests over time.

7. The evaluation of timber and non-timber forest products.

8. The theory and practise of optimum forest land allocation to multiple uses.

9. Forest tenures as economic instruments of forest policy.

10. Economic implications of fiscal policies in the forestry sector including stumpage and royalty charges and forest property taxes.

ABCPF FOREST ENTOMOLOGY ACADEMIC STANDARD

August, 1995

Scope:

Forest entomology requires a broad understanding of the principles of forest insect management in B.C. and is, therefore, an essential component of any forest health educational program. An understanding of major problems and their potential prevention or treatment within a framework of legal responsibilities and operational policies is required. Such a course must span environmental, economic and social parameters related to approved forest ecosystem management objectives and practices. Instruction must emphasize practical situations related specifically to stand dynamics and ecological integrity of forests, including preventive treatments, and factor these opportunities into planning or prescriptive opportunities.

Objectives:

Candidates should be able to:

1. Interpret the place and function of insects in the forest, and know their structure, physiology, ecology and life cycles.

2. Combine a knowledge of insects and their forest habitats so as to manipulate both through forest management to prevent problems and minimize damage, and to understand, where appropriate, how to survey for, apply and cost out appropriate treatments.

3. Be aware of available guidelines or procedures concerning the major insect pests in BC (eg Forest Practices Code guidelines for ensuring forest health.

Key Attributes:

The professional forester will have a working knowledge of:

1. Treatment alternatives.

2. Obligations (legal, regulatory, moral) to deal with forest insect pests, particularly as integral functions of planning for silviculture, protection and harvesting.

3. Decision-making processes and procedures to deal with important forest insects to satisfy requirements for the creation or maintenance of healthy forests.

4. Detection, impact assessment, appraisal of forestry and other resource values threatened and possible consequences of control measures, including public opinion. Selected case histories. Sample survey methods, insect collection and preservation.

ABCPF FOREST HARVESTING (FORMERLY TIMBER HARVESTING) ACADEMIC STANDARD

August, 1995

Scope:

The field of forest harvesting addresses the engineering, economic, and environmental factors associated with transportation and harvesting systems used in integrated forest resource management. These include forest road design and location, geotechnical engineering, drainage, planning, locating and scheduling the harvest, and an international perspective on logging systems and their application to meet silvicultural objectives. Forest harvesting is a specialized field within forestry, and professional competence within this field (especially road location and design) requires significant course work and an extended field internship in addition to the minimum standards identified here for the "general" forester.

Objectives:

Candidates for professional forester registration should have:

1. A clear understanding of their professional competence and limitations within forest harvesting and forest engineering.

2. A sufficient understanding of the engineering, economic, and environmental implications of harvesting and transportation systems to communicate and work with specialists in forest harvesting and forest engineering.

3. An understanding of the appropriate harvesting and transportation systems for a range of silviculture systems and site conditions.

4. The ability to produce integrated resource plans.

Key Attributes

Candidates should have a fundamental understanding of the following components of forest harvesting:

1. Forest road design and location.

2. Watershed drainage and slope stability.

3. Forest road construction, maintenance, and deactivation.

4. Phases of harvesting.

5. Technical, economic, and environmental limitations of forest equipment and harvesting systems.

6. Factors affecting harvesting productivity.

7. Forecasting and budgeting of productivity and costs.

8. Constraints and techniques used in harvest unit design and location.

9. Factors affecting quality, quantity and value of the harvest.

10. Short-term, operational planning, including scheduling, budgeting and inventory control.

11. Long-term landscape level planning, including spatial and temporal projections of the harvest and road networks sufficient to meet integrated resource objectives.

12. Professional responsibilities identified in the Forest Practices Code.

ABCPF FOREST HYDROLOGY ACADEMIC STANDARD

August, 1995

Scope:

Forest hydrology deals with the effects of forest and land management on water quantity and quality, erosion , and sedimentation. It recognizes the relationships between land use, soil, and water, and the linkages between uplands and downstream areas.

Objectives:

Professional foresters should understand:

1. The relationships between forest land use, hydrologic cycle, stream systems dynamics.

2. The potential impacts of forest management on streamflow regime, water quality, and erosion.

3. How to implement good watershed management re. road location, construction, and maintenance, silvicultural systems, logging methods, and post-logging treatments.

4. How to recognize problem areas where specialist opinion is required.

Key Attributes

For an adequate grasp of the subject for both coastal and interior regimes, the candidate should understand:

1. Basic principles: hydrologic cycle, water balance, rain (areal patterns, frequency analysis), snow accumulation and melt, interception, topographic and forest influences, evapotranspiration (open water, vegetation, and soil) and its measurement and calculation, runoff (surface and subsurface flow, stormflow generation), forest management effects on peak, low and annual flow, and hydrologic recovery.

2. Watershed processes: drainage patterns, runoff models, hydrologic response.

3. Erosion and mass wasting: causes, hazard indices.

4. Stream channel dynamics: channel development and erosion, role of vegetation and organic debris, fisheries implications.

5. Water quality: physical, chemical, temperature, forest management effects, fisheries implications.

6. Watershed management: assessment, protection, rehabilitation, road drainage.

7. Legislation & regulation: guidelines, procedures, prescriptions, forest practices code, community watersheds.

ABCPF FOREST LAND MANAGEMENT ACADEMIC STANDARD

August, 1995

Scope:

Forest management involves controlling interventions in, and disturbances to, the various components that comprise the forest, based on society's demands for various goods and services from the forest, while maintaining the ecological integrity of the forest over time. In order to this successfully, the professional forester must have a broad understanding of the biological, social, and managerial principles upon which forest management is based.

Objectives:

Candidates who wish to become a professional forester should have an understanding of the principles of the following aspects of forest land management:

1. stand and forest dynamics;

2. the forest-level impacts of various silvicultural activities;

3. modelling approaches available to model stand and forest dynamics and silvicultural impacts;

4. management planning systems;

5. the impacts social development and changing legislation on forest management.

Key Attributes

Understanding of the following components are important for the candidate to acquire a proper grasp of this subject area:

1. decision theory (risk and uncertainty; subjective probabilities; information acquisition; probability revision; etc.)

2. stand dynamics (factors that affect the growth and development of stands; growth and yield modelling; predicting future stand conditions)

3. basics of even and uneven aged management systems

4. the evolution of forest regulation (sustained yield; fully regulated forests; area and volume control approaches; etc.)

5. collection and management of data required for forest management

6. forest estate models (characteristics of mathematical programming and simulation-based approaches; approaches to spatial modelling; exposure to particular examples)

7. forest land planning (concepts and approaches; hierarchical organization; specific examples of planning systems)

8. public involvement in planning and management (effective communication; incorporating public feedback; etc.)

ABCPF FOREST MENSURATION ACADEMIC STANDARD

August, 1995

Scope:

Major management decisions in forestry are based on measurements and estimates of the forest resource. course in forest mensuration provides a basic understanding of the methods used to measure and estimate forest resources.

Objectives:

1. To learn to measure characteristics of standing and cut trees.

2. To learn the basic theory and application of multiple linear regression for predicting characteristics not easily measured.

3. To learn the theory and application of photogrammetry, including how to measure tree and forest characteristics, and distances and areas on photographs.

4. To learn the theory and application of geographic information systems.

5. To learn the basic theory and application of sampling designs for sampling small areas of forested land. Also, to discuss the more complicated designs that are used to obtain estimates for larger, more diverse forest land areas.

6. To learn the basic processes of tree and stand growth and yield, and the application of these processes for projecting stand growth and yield. Also, to introduce computer models currently used in B.C. to estimate growth and yield.

7. To introduce the concepts and uses of experimental design and how it compares to sampling design.

Key Attributes

Understanding of the following components are important for the candidate to acquire a proper grasp of this subject area:

1. Basic timber measurements on standing trees
   - Tree dbh, height, form, age, bark thickness
   - Upper stem diameters and tree volume measurement
   - Tree volume and decay estimation

2. Scaling and grading of timber

3. Simple and multiple linear regression for estimation
   - Theory of least squares regression analysis
   - Assumptions of least squares regression analysis
   - Application of regression for estimating volume of standing trees and other forests parameters

4. Forest measurements from photographs
   - Intro to photographs
   - Tree height measurement

Radial line triangulation and other mapping methods
Calculation of distance and areas from photographs

5. Introduction to the use of Geographic Information Systems for Forest Inventory

6. Theory of sampling design and application to inventory of a variety of forest resources (timber, wildlife, recreation, water, etc.)
   Theory of sampling
   Simple random sampling and systematic sampling and applications
   Regeneration and Residue sampling designs
   Stratified random sampling
   Ratio/Regression sampling and applications
   Introduction of multistage sampling, double sampling, etc.

7. Introduction to the use of experimental designs
   Brief background to the theory of experimental designs and comparison to sampling designs
   Single factor analysis of variance and applications
   Single factor analysis of covariance with one covariate and applications

8. Prediction of Future Growth and Yield
   Principles of Tree and Stand Growth
   Measures of Tree and Stand Growth
   Stand Table Projection
   Computer Growth and Yield models

ABCPF FOREST PATHOLOGY ACADEMIC STANDARD

August, 1995

Scope:

Forest pathology is an essential component of forest land management. Tree diseases and related conditions have major effects on forest vegetation and ecosystem dynamics. Foresters must have a broad understanding of disease agents, how they function in forest ecosystems, and how they are affected by forest management practices.

Objectives:

Professional foresters candidates should have:

1. A working knowledge of disease groups, biology of pathogens involved, and their role in natural ecosystems.

2. An understanding of how forest management practices can favour or be used to prevent or reduce disease impacts, and thresholds for applying disease treatments in forest ecosystems.

3. An understanding of approaches used to measure disease effects and forecast impacts.

4. An ability to develop management plans and prescriptions that consider disease conditions and their treatment.

Key Attributes

Candidates should have a fundamental understanding of the following components of forest operations:

1. Role of pathogens as natural disturbance agents or introduced components of ecosystems (mortality, decomposition, gaps, succession, heterogeneity, symbioses, selection, food, habitat, extinction).

2. Major disease groups (biology, damage, ecology, of root diseases, dwarf mistletoes, stem cankers and rusts, foliage diseases, seedling, seed and cone diseases, abiotic injuiry and decline syndromes).

3. Surveys (field identification, procedures).

4. Management treatments, strategies and effects of management practices on disease development and impacts.

5. Use of models to forecast disease effects and evaluate interactions with management practices.

6. Develop recommendations for landscape and stand-level plans and prescriptions.

ABCPF FOREST SOILS ACADEMIC STANDARD

August, 1995

Scope:

Soil is the medium in which a myriad of complex biological and physical processes occur which ultimately supports significant bacteria, fungal, plant and animal populations which in-turn interact together to help create ecosystems. Soil is a natural, dynamic occurring resource that is always affected, detrimentally or beneficially, to some degree as a result of human activities or environmental forces.

Soils, forest and grassland, in Canada are considered young and are not considered to be very compact which allows good root egress. Any traffic over or modification of these soils could have negative or positive impacts. However, unless these soils remain natural and untouched, managers need to know the impacts being created on them and what can be done to minimize the impacts or rehabilitate these forest and grassland soils.

Foresters therefore must have an appreciation of soils so that they can manage the forest and grassland soil resource on a sustainable bases. Soils are ultimately the resource Foresters must manage on a sustainable basis if they are to maintain or enhance the biological productivity of the land base they are managing.

Objectives:

Foresters should:

1. Have the ability to classify forest and grassland soils according to the Canadian Soil Classification System to the Great Group level and, when necessary, to a Subgroup level.

2. Be proficient in describing soils in the field and recording this information on a proper soil description form.

3. Be able to properly hand texture different soil horizons in a soil pit.

4. Be able to recognize and describe mor, moder, and mull upland humus forms along with Organic Order horizons Of, Om, and Oh.

5. Be able to technically define and describe the various physical and behavioral properties of soils and produced a detailed report.

6. Be knowledgeable about the role water plays in supporting biological populations in the soil.

7. Be able to state what management techniques are available to help conserve, protect, rehabilitate, or utilize forest or grassland soils.

8. Be proficient in reading and interpreting soil and terrain maps.

9. Be able to demonstrate how to access the impact of forest management situations on the environment using soil and terrain information.

10. Be knowledgeable about the nitrogen, sulfur, carbon, potassium and phosphorus cycles in forest and grassland soils.

11. Be aware of the role soil organisms play in soils

12. Be aware of the role soil water has with respect to engineered structures utilizing natural soil material.

13. Be aware of the role organic matter has in soils.

14. Be able to describe in detail the Unified Soil Classification system.

15. Be able to correlate the Unified Soil Classification system with the Canadian System of Soil Classification coarse fragment and soil texture classes.

Key Attributes

Understanding of the following components are important for a Forester to acquire in order to properly grasp this subject area.

1. Surficial material (mode of origin and composition, center studies on glaciated terrain).

2. Terrain classification (be able to identify various terrain features on aerial photographs in the field).

3. Factors of soil formation (climate, water, mineral/rock, time and vegetation).

4. Soil forming processes (e.g. mineral weathering, eluviation, illuviation, transformation).

5. Water relationships in soil (both biological and physical).

6. Physical and behavioural properties (soil texture, coarse fragments, particle density, bulk density, consistence, structure, colour, hydraulic conductivity, infiltration capacity, field capacity, thermal conductivity, air content, diffusion coefficient, matric potential, water potential, temperature, soil gas concentration, porosity, water holding capacity, tilth).

7. How to calculate bulk density, particle density, void ratio, degree of saturation, water content and porosity.

8. Be knowledgeable about soil engineering properties such as bearing strength, cohesive strength, shear strength.

9. Unified Soil Classification system.

10. Canadian System of Soil Classification.

Orders:	Podzolic, Luvisolic, Brunisolic, Regosolic, Chernozemic, Solonetzic, Organic, Gleysolic
Great Groups:	of the above mentioned Soil Orders.
Subgroup:	keyed based on horizon sequencing.
Horizons:	proper labeling and sequencing.

11. Collect appropriate soil pit data which would enable a Forester to classify the soil to the soil series level.

12. Use soil and terrain maps and reports.

13. Develop prescriptions for remedial activities on degraded soils resulting from a variety of operational activities.

14. Soil nutrient cycles (nitrogen, carbon, potassium, phosphorus and sulfur).

15. Soil properties important for forest engineering activities.

16. Prescribe ways to manage water on forest and grassland soils.

17. Assess the effect forest management has on forest and grassland soils.

18. Recognize mor, moder and humus forms.

19. Recognize Organic Order Of, Om and Oh horizons.

20. Link the Unified Soil Classification System textures with the Canadian System of Soil Classification coarse fragment and soil texture classes.

ABCPF FOREST SURVEYING ACADEMIC STANDARD

August, 1995

Scope:

Basic forest surveying involves the theory and application of plane surveying techniques. The professional forester must have a basic understanding of general surveying techniques, the types of survey systems available, their potential precision and the types and magnitudes of errors that can occur during surveys in the forest environment. A basic understanding is required of the appropriate survey technique appropriate for property boundary location, inventory plot layout and relocation, cut block boundary location as well as route survey and design.

Objectives:

Professional forester candidates must have:

1. A working knowledge of common forest surveying techniques.
2. The ability to properly use the common forest surveying instruments.
3. The ability to specify the appropriate level and type of survey for various field applications.
4. An understanding of the attainable accuracy and precision possible with various survey techniques.
5. An understanding of the types of errors that can occur during various surveys.
6. A working understanding of survey calculations and adjustments.
7. The ability to apply survey methods to mapping, calculation of distances, areas and volumes.

Key Attributes:

Understanding of, and some field experience with, the following components are important for the candidate to acquire a proper grasp of this subject area:

1. Theory of measurements and errors: errors in measurement, sources of error, elimination of errors.
2. Linear measurements: pacing, chaining, indirect measurement.
3. Direct and indirect leveling: differential and trigonometric with clinometer.
4. Measurement of angles and directions: declination, local attraction.
5. Use of the hand compass.
6. Open and closed traversing and traverse computation: compass rule.
7. Use of transit (or theodolite)
8. Use of laser and GPS systems.
9. Stadia surveying and contour mapping and map reading.

10. Area distance and volume measurement and calculation.

11. Running deflection lines and location of previously surveyed points.

ABCPF FOREST TRANSPORTATION SYSTEMS ACADEMIC STANDARD

August, 1995

Scope:

Forest transportation systems play an integral part in the management of forest lands. They not only provide access to the timber supply and the means of delivery of the raw material to the mill and marketplace, but also provide access for range, recreation and other activities. This subject deals with the movement of primary forest products from the landing to the mill.

Objectives:

1. To understand the processes and functions involved in transporting wood fibre from the landing to mill or marketplace.

2. To understand and be able to evaluate the economic implications of the transportation system on the timber supply and its utilization.

3. To understand the importance of access management planning and how transportation networks impact on non-timber resources and on public use with the attendant liability.

Key Attributes:

1. General: Role of transportation systems, historical methods, current alternatives.

2. Access Management Planning:
   Access development planning.
   Total Resource Development Plans.
   Public involvement, safety and liability.
   Road maintenance, upgrading and deactivation planning.

3. Locations of Roads:
   Office preparation.
   Field reconnaissance, location and survey.
   Road design work.
   Interaction with appropraite disciplines (P.Eng., P.Geo., etc.)
   Road classification and survey standards (main haul roads, secondary roads, spur roads).

4. Road Construction.

5. Structures: Site plans, design work, construction and maintenance.

6. Transportation Networks: by air, rail, truck and water.

7. Log Handling: Loading/Unloading, woods sort, dryland sort, water sort, booming.

8. Transportation Analysis: Costing, computer application of transportation systems analysis and impact of different harvesting methods.

9. Environmental and Other Resource Use Implications.

10. Government Regulations: Impact of.

ABCPF INDUSTRIAL FOREST MANAGEMENT ACADEMIC STANDARD

W. J. Bruce Devitt, RPF February, 2001

Scope

Forestry systems and structures are often arbitrary and usually man-made. But because they affect the practice of forestry, it is important they be understood. This subject should enable the professional forester to better understand the relationships, interactions, functions, politics and associations that make up the forest-based community within British Columbia (BC), Canada and the world. From an ABCPF perspective, the emphasis naturally would focus on BC with a description of the impacts of external influences on markets and policies.

Objectives

a. To build a strong awareness of the principles and techniques of forest management.
b. To introduce and provide a broad perspective and understanding of the institutional systems and structures within which the professional forester functions and operates.
c. To examine the public and private roles of the principal organizations in the forest sector, and to explain their relationships, how they make decisions and how they influence the decisions of others.
d. To build a strong awareness of the ethical and technical standards of professional forestry and the related professional accountability.

In short, the intent is to provide a working knowledge of some of the important dynamics of the real world of forestland management and use from actual experience. Emphasis throughout should be on historical background, current situation with understanding of controversial issues.

Description of Topics

a. Historical background and issues
b. Forest Industry Structures
c. Business, Forest Finance and Administration
d. Industrial relations in forestry, including WCB
e. Forest planning and harvest development
f. Government structures, and forest management mandate, provincial and federal roles
g. Supporting structures, training & education, research, professional and technical
h. Other stakeholder groups
i. Professional ethics and standards

Suggested References

Please contact the Registration Dept. for the list of references.

ABCPF INTEGRATED RESOURCE MANAGEMENT ACADEMIC STANDARD

Frederick Marshall, RPF, Bruce Sieffert, RPF and Charles Western, RPF August, 2002

Scope

Integrated Resource Management (IRM) uses a range of processes to integrate physical, biological, social, economic, cultural and spiritual values of the forest. The processes include broad forest management plans to operational guidelines to stakeholder meetings to one-on-one consultations. IRM represents a significant departure from historic forestry in British Columbia and requires the application of knowledge and fundamentals learned in all core subject areas. IRM places technical forestry within a social and biophysical context.

Pre/Co Requisite Knowledge

Candidates who wish to become a professional forester should have:

1. A comprehensive understanding of IRM principles – i.e. consideration of all values, engagement in open, consensus-building processes, if a government employee to remain value neutral, to ensure consistency with higher level plans.
2. A comprehensive understanding of IRM approaches and tools – interdisciplinary team approach, public involvement, decision-making theories, negotiation processes, analysis models and methodologies.
3. A working knowledge of the generic planning processes within an interdisciplinary team environment – information gathering and synthesis, option development, decision, implementation, monitoring, amending and updating.
4. An appreciation of, exposure to and experience with IRM processes and outcomes from at least two different planning levels.

Objectives

a) Key Attributes (foundation principles)

Knowledge of the following components is required:

1. Current literature
2. Understanding of biophysical systems (geologic, terrestrial, aquatic, and biological components and their inter-relationships
3. Understanding of social systems (cultural, institutional, political, economic components and their inter-relationships, including the ranges and "quality" of sectoral interests
4. Understanding of economic systems (marketplace, tenure system, stumpage/appraisal systems etc.)
5. Knowledge of current and relevant legislation, regulations and government policies pertinent to resource management, allocation and use.
6. Tools for information and analysis of the above systems
7. Tools for evaluation and negotiation process
8. Problem solving processes (planning and dispute resolution processes, interest based negotiation, consensus building, risk and uncertainty)
9. Demonstrate proficiency at report writing and public speaking

Institutions wishing to have courses eligible for IRM accreditation should:

1. Include complete course descriptions identifying subject, # of hours, lecture/lab components etc;
2. Identify how grades are assigned;
3. Express in a covering letter how the course material meets the IRM standards of the ABCPF; and
4. Identify whether courses offered are “core” or optional.

Individuals requesting credit in IRM must complete and submit the following:

1. An up-to-date resume;
2. A complete package of course descriptions pertinent to IRM;
3. A covering letter outlining how the education and experience meet the IRM standards; and
4. A copy of a recently completed report or public presentation completed by the applicant.

ABCPF MANUFACTURE OF FOREST PRODUCTS ACADEMIC STANDARD

August, 1995

Scope:

The forester must be aware of the requirements of the processing plants and the marketplace to fully appreciate his role in the forestry system.

Objectives:

1. To have a knowledge of the manufacturing processes required to produce the salable product from the timber resource.

2. To have a full awareness of the fact that growing the timber is only one step in the production of forest products which must compete in the world marketplace.

3. To understand that the processing plant should be tailored to the resource available.

4. To be knowledgeable of the products produced from the various species of commercial trees in British Columbia.

Key Attributes

1. Sawmilling:
   Introduction, history of sawmilling in B.C., definition of lumber; principles of sawmilling operation; log sorting, merchandising & optimization; classification of sawmills; debarking and types of debarkers; log breakdown equipment; headrigs, canter lines, end doggers & scanner optimization of each; circular & band saws and factors affecting sawing, principles of lumber recovery (LRF); optimized edgers & trimmers; bin sorters; residue chippers and chip production.

2. Treatment of Wood:
   Moisture in wood, air drying practices, kiln drying; planer mill, different planer types, preservation of wood; types of preservatives; non-pressure methods; preservation plant; pressure treatment; uses for treated materials.

3. Wood Components and Engineered Wood Products:
   History of veneer and plywood; veneer-lathe and peeling, knife and pressure bar assembly; green veneer handling; yield of peeling; veneer drying; veneer preparation for gluing; define plywood; natural base glues; synthetic adhesives; gluing factors, strength development in joint; gluing in plywood plant; finishing of panels; glulam manufacture; quality control aspects in manufacture; Oriented strand board (OSB), medium density fibreboard (MDF), & laminated veneer lumber (LVL) manufacturing processes.

4. Secondary Manufacturing of Value Added products in B.C.:
   History & trends in secondary manufacturing. Cedar products; siding, paneling & decking; boards, industrial lumber, joinery lumber for Europe; window / door components; Japanese house components. Structure of industry & forest policy issues.

5. Pulp and Paper Products:
   Pulp and paper in history; raw materials - wood; raw materials - water; debarking operation; contaminants in pulp, bark, dirt, woodroom operation; sulphate pulping; digester house; sulphate cooking process; Kamyr; chemical recovery cycle; pulp treatments; multisage bleaching; wet machines; drying and finishing; sulphite pulping; semichemical pulping; groundwood and grinding variables; affect of wood quality, decayed wood;

freeness of pulp; T.M.P. Hollander beater; refiners; beating of pulp; strength development in paper; additives; paper machine; coating; finishing of paper.

6. Wood Product Marketing
Historical review of resource base, exports, production of cants, lumber - dimension, J-Grade, MSR products; technological advances, plywood vs OSB, & MDF, LVL, Parallam, & Truss - Joists; pulp & paper products. Composition of major world markets; North America, European Common Market, & the Pacific Rim, products used, distribution channels; historical review & long term forecasts.

ABCPF MATERIAL PROPERTIES OF WOOD ACADEMIC STANDARD

August, 1995

Scope:

The utilization of wood is critically dependent upon a knowledge of its basic properties. If foresters are to grow wood for harvest, they must know about the nature of wood characteristics, wood variability between and within species and how tree growth can affect wood quality.

Objectives:

Candidates to become a professional forester should have:

1. An understanding of the cellular structure of wood, and the influence of structural variations on wood properties.

2. An understanding of the factors influencing the interaction of wood with moisture; wood weight; and the strength of wood and wood products.

3. An understanding of the chemical nature of wood, the chemical structure of the wood cell wall itself, and its bearing on the physical and strength properties of wood and pulp.

4. A quantitative appreciation of variability in wood (between species, within species and within a single tree.

Key Attributes:

Understanding of the following components are important for the candidate to acquire a proper grasp of this subject area:

1. Wood anatomy (wood formation, cell types, organization and structure-function relationship

2. Wood identification (major species of British Columbia and Canada).

3. Basic wood chemistry (wood components, cell wall ultrastructure).

4. Material properties of wood (variability, anisotropy, hygroscopicity, biodegradability, specific strength, workability).

5. Wood-moisture relationships (moisture content concepts and calculations, shrinkage-swelling, drying effects).

6. Physical properties of wood (density and specific gravity concepts and calculations).

7. Strength properties of wood (mechanical properties, strength, elasticity, stresses in wood beams, reactions and moments)

8. Wood variability (levels of variability, reaction wood, juvenile wood).

9. Wood quality (concepts and measures, effects of silviculture on tree growth and wood formation)

ABCPF ORAL COMMUNICATIONS ACADEMIC STANDARD

Jerome Marburg, MBA, LLB and Roy Strang, PhD, RPF(Ret) February, 2002

Scope/Objectives:

The professional forester must be able to communicate with a wide range of audiences clearly and effectively. The technical complexities of practice and public interest in forest management require the professional forester to be able to communicate complex ideas and concepts not only to fellow experts but also in simple/clear terms understandable by the lay public. The forester recognizes that there is a wide range of values placed on forest resources and weightings given those values by differing public groups or individuals. The tension created by competing interests requires the professional forester to be an attentive listener and a competent negotiator and conflict resolution manager.

Key Attributes

Candidates for registration as professional foresters in British Columbia should demonstrate knowledge, understanding and proficiency in:

1. The theory and application of effective speech presentation.
2. The use of audio-visual technologies for presentation of speeches and delivery of information.
3. Public presentation skills.
4. Organization and facilitation of multi-party, multi-interest forum, discussion groups, and round-table.
5. Presentation to a variety of audiences, including contentious/hostile audiences and issues.
6. Cross-cultural issues of communication and perceptions of communication as well as values and perspectives.
7. The theory and application of negotiation skills and conflict resolution, including interest-based negotiation.

Requirements for Recognition:

1. Graduation from a Canadian Forestry Accreditation Board (CFAB) accredited forestry program, or.
2. (a) Completion of an approved public speaking program and

   (b) Completion of coursework in Negotiation and Conflict Resolution
3. Please contact the Registration Dept. for the list of accredited courses.

ABCPF REMOTE SENSING AND PHOTOGRAMMETRY ACADEMIC STANDARD

August, 1995

Scope:

To meet societal expectations of forest management, Professional Foresters require detailed and consistent forest resource data. Remote sensing techniques, such as the interpretation of aerial photographs and, increasingly, satellite image analysis are the most practical and economical method for collecting this data. Foresters who work with end-use data, such as maps and aerial photographs, should have a strong working knowledge of the methods form which this data was derived.

Objectives:

Candidates to become a professional forester should have:

1. Theoretical and practical experience concerning basic photogrammetry and photo interpretation for forestry purposes.

2. Theoretical and practical experience concerning terrain analysis from photo interpretation.

3. Knowledge of the applications and limitations of remote sensing for forestry purposes including the relationship with GIS.

Key Attributes

Understanding the following components are important for the candidate to acquire a proper grasp of this subject area:

1. Aerial Photography:
   - spectral reflectance
   - cameras, films and filters
   - photo scale

2. Photogrammetry:
   - parallax and photo measurements
   - mapping, mosaics and orthophotos

3. Photo Interpretation:
   - tree species identification
   - forest typing and classification
   - land forms and terrain analysis
   - identification and classification of vegetation damage

4. Remote Sensing:
   - principles and applications of remote sensing for forestry
   - platforms, sensors and resolutions
   - difference between imagery and photography

5. GIS:
   - the analysis and incorporation of remotely sensed data within a planning framework.

ABCPF SILVICS ACADEMIC STANDARD

David Handley, RPF (Ret) and J. Gregory Cowman, RPF February, 2002

Foundation

Selection of tree species at any stage in Forest Management requires an intimate knowledge of the silvical and physical characteristics of each tree species and their adaptability to varying site and ecological conditions. Knowledge must be comprehensive enough to reach reasoned decisions, especially in unusual or borderline situations.

Objectives

Candidates who wish to become a professional forester must:

Understand the concept of silvics and the implications that individual species silvical-characteristics may exert on stand management decisions in both pure and mixed stands, soil and fertility sustention, wood quality and quantity, and ecosystem development.

Demonstrate the ability to apply silvical knowledge in a reasoned way to achieve the desired end results efficiently and effectively.

Be able to integrate silvical knowledge with knowledge of other subjects or resource values to achieve specific objectives at the stand, landscape, watershed or forest level.

Key Attributes

Understanding of the following components is essential:

1. The concepts of synecology and autecology.
2. The silvical attributes of all the genera and the majority of tree species of B.C.

3. The geographic distribution of each of the important tree species and the natural factors which affect their distribution.

4. The ecological amplitude of each of the important tree species, particularly with respect to the variables that govern adaptation and successful development under specific site conditions and/or silvicultural systems.

5. The role individual tree species may play in;

   - Protecting other tree species from climatic stresses, insects, disease, or animals;
   - Ameliorating soil conditions;
   - Providing biomass as part of the food chain in streams and for land based animals.
   - Sheltering other plants and animals .

Original: D. Handley (August 1995)

ABCPF SILVICULTURE ACADEMIC STANDARD

August, 1995

Scope:

Silviculture is concerned with the art and science of controlling the establishment, growth, composition, health and quality of stand of trees in forests. The objective is to meet the diverse needs and values of landowners and society on a sustainable basis. It is essential that the professional forester understand the technical effects of stand level silviculture actions and their connection to the goals of managing the whole forest. Individual stand management objectives should be set and silviculture prescriptions prepared which are designed to meet these objectives. Forest management actions are protection, harvest scheduling, location and quantity, and renewal and tending; the latter two are silviculture.

Objectives:

Candidates who wish to become a professional forester should be able to:

1. Correctly identify and diagnose forest stand and forest site conditions and potentialities.

2. Prepare defensible silviculture prescriptions for both stand renewal and subsequent tending to meet identified stand management objectives.

3. Evaluate, analyze, implement, monitor, and audit harvesting and silviculture activities to ensure achievement of management plan standards or codes of practice.

4. Prepare, plan and implement silviculture strategies and develop site specific silviculture standards.

5. Understand how planned stand level silviculture activities across a managed landscape can meet forest managment objectives.

6. Understand how planned stand level silviculture activities across a managed landscape can meet forest management objectives.

Key Attributes

Understanding of the following components are important for the candidate to acquire a proper grasp of this subject area:

1. How individual trees grow, their physiology and silvics; how basic nursery and seed operations are conducted and the elements of forest tree improvement.

2. How stands of trees grow naturally and respond to human manipulation including self-thinning theory and the elements of growth and yield and vegetation management.

3. An appreciation of the risks of loss of trees to insects, disease, windthrow and old age and how these risks influence silviculture practices and biodiversity.

4. An appreciation of how planting, density control, commercial thinning, tree improvement, fertilizatioon and pruning influence stand growth, yield, diameter distributions, tree quality and genetic, species, and stand structure biodiversity.

5. An appreciation of various philosophies, ideas, concepts and notions that influence forest management activities in B.C. public forests.

6. The elements of forest management planning.

ABCPF TECHNICAL / PROFESSIONAL WRITING STANDARD

December, 1995

Scope:

There is an increased emphasis in professional life on public discourse. This includes written and oral advocacy. More and more, the professional forester is finding him/herself in the public eye. To properly represent the profession, foresters must demonstrate a high competency in written communication skills including organization, grammar, and presentation of technical content.

Objectives:

Candidates who wish to become a professional forester should have:

1. Knowledge of proper grammatical and organizational techniques.

2. Practice as well as proficiency in various types of professional writing.

3. An understanding of the principles of effective communication.

Key Attributes

The following abilities are required of a modern professional forester:

1. Summarize current literature in a given field of practice.

2. Generate report proposals, requests for proposals, and formal bids.

3. Write clear explanations of technical or complex processes.

4. Write clear instructions for performing a procedure.

5. Develop management plans, operational plans, silviculture prescriptions, and other such documents required under legislation in place from time to time.

6. Compose memo reports.

7. Write formal reports, the standard for which is described in more detail below.

Standard to Apply to Professional Reports.

The standard to be applied to professional reports should be that the work should be of sufficiently high standard (both in terms of technical content and in terms of grammar, organization, and structure) that the paper could be published and a fellow professional as well as a member of the public would accept it as being professionally and technically competent. The report should also be one that both reflects and advances the reputation of the practice of professional forestry as well as high standards of professionalism.