



MODEL CURRICULUM

BACHELOR'S DEGREE PROGRAM

FOR NON-PHYSICIAN-ANAESTHESIA PRACTITIONERS

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Introduction

Bachelor's degree non-physician- anesthesia programs are offered by universities at graduate level. They require a heavy student workload covering three full-time calendar years. The length of the program is necessary for students to complete all learning activities and achieve the expected outcomes. Distribution of credits varies among countries (see appendix II, European example). Therefore this task is left to the respective educational institutions.

Location of the program

The Bachelor's degree program should reside within an academic department or in a sponsoring department of a university with involvement of faculty in several different departments.

Curriculum

The curriculum is intended to produce Non-Physician Anaesthesia Practitioners (NPAPs) who:

- Provide anesthesia under indirect and/or direct supervision, independently and in cooperation with physician anesthetists
- Collaborate with other members of the perioperative team
- Maintain patient safety and transparency to the public
- Maintain quality of care and outcomes
- Develop adequate continuous education and training

The model curriculum is a possible way to meet the graduate competencies as outlined in the IFNA standards <https://ifna.site/app/uploads/2015/08/IFNA-STANDARDS-2016.pdf>. The structure can be altered and adapted to national, socio-cultural and legal circumstances. A record of clinical training (clinical assessments) and work place experience (number and variation of cases and procedures) has to be provided and the learning process, learning activities, meeting of learning outcomes and competencies should be documented in a professional portfolio.

Selection Process/ Entry Requirement

Minimum prerequisites for applicants/candidates for Bachelor's degree programs are:

- Ability to speak and write in the language of instruction
- Qualification enabling students to enter a university or university of applied science, defined by the respective national authorities
- To be determined by national legislation

Assessment Strategy

Assessment methods

- Formative and summative assessments of all classroom and clinical stages
- Demonstration of solid theoretical knowledge (written, oral)

- Ability to perform anesthetic procedures in a safe and correct fashion (clinical assessments)
- Proof of an adequate number and variety of cases
- Bachelor thesis
- All components of the assessment have to be passed to progress

Graduate Competencies

The graduate competencies, as outlined in the IFNA standards

<https://ifna.site/app/uploads/2015/08/IFNA-STANDARDS-2016.pdf> should be met at the end of the course.

Course structure

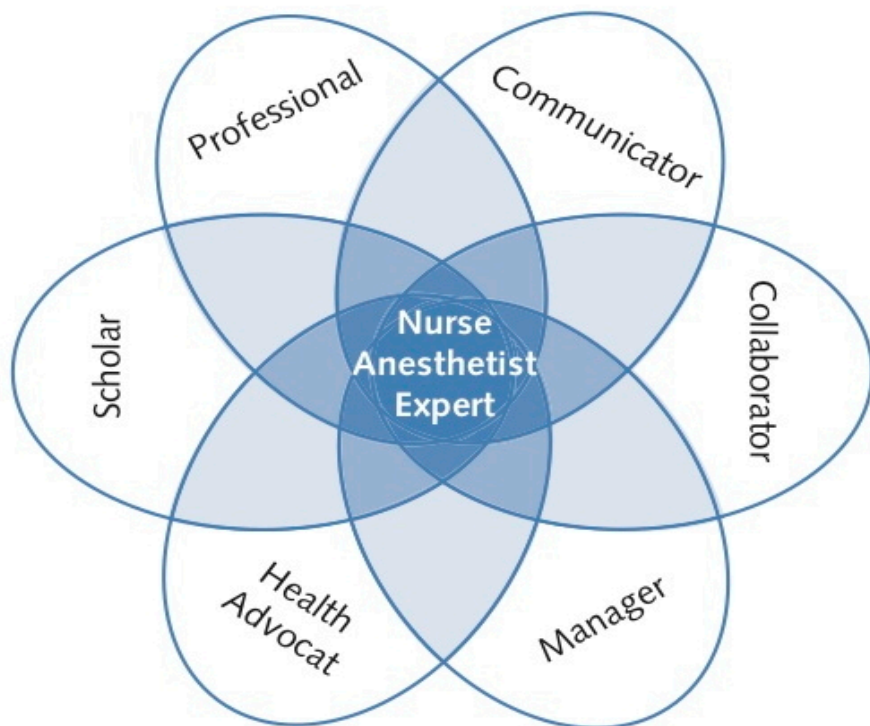
The course at Bachelor's degree level should last at least 36 months and consist of:

- Full time enrollment
- Extensive clinical experience
- Bachelor's thesis (see assessment strategy)
- Comprehensive assessments (see assessment strategy)
- Prescribed program of courses, seminars, projects or other structured activities that help students meet the learning outcomes
- Assigned faculty adviser or advisory committee for each student
- Availability of resources and facilities
- Plan to evaluate and improve the program

Conceptual framework

To define the graduate competencies, required for safe practice, the well-known CanMEDS competency framework has been adopted and adapted. The framework was initially developed by the Royal College of Physicians and Surgeons of Canada in 1996 to describe the core knowledge, skills and abilities of specialist physicians. Meanwhile CanMEDS has been widely adopted worldwide within medicine in general and within other healthcare professions such as nursing. CanMEDS identifies and describes seven different roles that together lead to optimal health care outcomes (see diagram below)

Frank JR, Ed. *The CanMEDS 2005 Physician Competency Framework. Better standards. Better physicians. Better care* Ottawa, Ontario, Canada: The Royal College of Physicians and Surgeons of Canada; 2005.



Adapted from the CanMEDS Physician Competency Diagram with permission of the Royal College of Physicians and Surgeons of Canada. Copyright © 2009.

Curriculum

1. Semester

01 CanMEDS Roles, ethical and legal issues

Analysis of non-physician anaesthesia history, professional associations and councils, legal aspects governing the profession, hospital and governmental regulatory agencies, non-physician anaesthesia scope of practice, informed consent, cultural competency, and ethical and professional considerations relating to anaesthesia.

Major Topics

History of non-physician anesthesia, legislation and scope of practice (standards) CanMEDS role model, professional regulation, ethics, cultural issues, informed consent, issues of professional associations.

Course objectives

1. Describe the historical development of non-physician anesthesia practice
2. Analyze major legal and ethical issues related to the specialty
3. Describe the significance of scope of practice issues in non-physician anesthesia
4. Describe and analyze the CanMEDS role model and its implication for practice
5. Analyze collaboration, communication under the aspect of patient safety

02 Basic Science

CanMEDS: expert, professional, scholar

Applied sciences course that introduces the basic principles of chemistry, physics and neuroscience and the integration of these principles into the practice of non-physician anaesthesia.

Major topics

Pressure, tension, flow, solubility, gas laws, diffusion, osmosis, vaporization, electricity, chemistry, anesthetic agents, neuroanatomy, neurophysiology, mechanisms of general anesthesia and physiology of pain.

Course objectives

1. Synthesize physical principles and their relationship to the practice of anesthesia
2. Differentiate neurologic anatomy and physiology and describe the effects of anesthetic medications on neurological systems.
3. Analyze and integrate select principles of organic and inorganic chemistry to the practice of anesthesia

03 Anatomy & Physiology

CanMEDS: expert

Major topics

Cardiovascular, respiratory, renal, neurological, hematological, and cellular anatomy and physiology, with particular emphasis on how these systems relate to anesthesia management.

Course objectives

1. Describe the important anatomical structures for each of the body systems presented
2. Discuss the major functions and processes of each of the major body systems
3. Synthesize the complex regulatory processes that produce homeostasis for each of the body systems discussed.
4. Analyze the effects of anesthesia on select physiologic systems

04 Pathophysiology I

CanMEDS: expert

Pathophysiologic disorders with emphasis on the surgical patient and implications for safe anesthesia management.

Major topics Endocrine disorders, neurological diseases, and respiratory diseases.

Course objectives

1. Analyze the pathophysiologic basis, manifestations, and treatment options for the disorders discussed
2. Integrate information regarding the presented pathophysiology with perioperative and anesthesia management

2. Semester

05 Pathophysiology II **CanMEDS: expert**
Pathophysiologic disorders with emphasis on the surgical patient and implications for safe anesthesia management.

Major topics Pediatric disorders, hematological diseases, cardiovascular disorders, renal disease, neuromuscular and musculoskeletal disorders, pain, psychiatric disorders, liver disease.

Course objectives

1. Analyze the pathophysiologic basis, manifestations, and treatment options for the disorders discussed
2. Integrate information regarding the presented pathophysiology with perioperative and anesthesia management

06 Pharmacology I **CanMEDS: expert**
Drug mechanisms, pharmacological effects, drug-receptor site interactions, structure activity relationships, therapeutic uses and adverse effects of agents used in the perioperative period.

Major Topics Pharmacokinetics/pharmacodynamics of induction drugs, inhalational anesthetics, benzodiazepines, anxiolytics, intravenous analgesic agents, local anesthetics, neuromuscular blocking agents and reversals.

Course Objectives Upon completion of the course the student will be able to:

1. Analyze the appropriateness of specific general and local anesthetic agent, considering patient – specific body habitus, age, physiology, concurrent medications, pathophysiology, and surgical procedure.

2. Discuss the uses, limitations and contraindications of depolarizing and non- depolarizing neuromuscular blockers, local anesthetics, cardiovascular - and asthma - medications recognizing differences in onset, duration of action, clearance, and side effects.
3. Synthesize appropriate and safe anesthesia management protocols utilizing the anesthetic agents discussed

07 Pharmacology II

CanMEDS: expert

Pharmacological basis of drug management as it relates to the use of drugs, both prescriptive and non-prescriptive for patients throughout the life span. Includes pharmacodynamics and pharmacokinetics of drug groups, dosage calculations, drug interactions and patient education.

Major Topics

Basics of pharmacotherapy & dosage calculations, receptors, peripheral & autonomic nervous system drugs, central nervous system drugs & psychiatric drugs, gastrointestinal, hematologic & dyslipidemia drugs, smooth muscle & pulmonary drugs, cardiovascular & renal system drugs, endocrine system drugs, antibiotics & analgesics, pain management, drugs of abuse, arthritis and gout.

Course objectives

At the completion of this course, the student will be able to:

1. Understand the pharmacokinetics and pharmacodynamics of broad categories of drugs
2. Describe the pharmaco - therapeutics of broad categories of drugs including prescription drugs, complementary therapies, and non – prescription medications
3. Understand the relationship among pharmacologic agents, pathophysiology and physiologic response
4. Describe adverse reactions, monitoring parameters, and drug interaction considerations for broad categories of drugs

08 Basic Principles of Anesthesia

CanMEDS: expert, communicator, health advocate, collaborator, professional

Basic principles of preoperative patient assessment, anesthesia planning, operating room preparation, interpretation of patient findings, and required documentation for safe anesthesia management, theory of fear and anxiety, principles of communication, theory of crisis intervention, Principles to maintain patient safety.

Major topics

Non-invasive monitoring, airway anatomy, assessment, management, preoperative assessment, fluid and blood

component therapy, positioning, anesthesia machine functions, documentation, universal precautions and infection control, collaboration, communication, anxiety control, health education, and non – technical skills

Course objectives

1. Outline the components, describe the operation, perform equipment checks and demonstrate procedures for safe use of the anesthesia machine and adjunctive equipment.
2. Synthesize information obtained in a comprehensive preoperative evaluation and formulate a basic anesthesia plan of care, including positioning, fluid administration, basic monitoring, and airway management.
3. Communicate perioperative assessment findings, derived from the synthesis of data, in appropriately documented form.
4. Describe crisis intervention methods, characteristics of teamwork and collaboration
5. Task Management
6. Planning and preparing

09 Advanced Principles of Anesthesia I

CanMEDS: all roles

Anesthetic principles associated with specific specialty procedures, management of identified patient groups and patients with special problems.

Major topics

Gynecologic procedures, obstetrics, orthopedic procedures, general surgery, ENT- procedures, pediatric patients and geriatric patients.

Course objectives

1. Synthesize appropriate and safe anesthetic management plans based on the patient's age, pathophysiology, and surgical procedure
2. Differentiate anatomical and physiological features, equipment issues, and pharmacological considerations unique to pediatric patients
3. Differentiate anatomical and physiological features and pharmacological considerations associated with geriatric patients
4. Demonstrate features of collaboration, workplace – and team organisation as well as ethical and professional aspects

3. Semester

10 Research theory

CanMEDS: scholar

Research design, methods and critique of research for utilization in practice.

Major topics

Quantitative and qualitative research methods
Critiquing research
Planning research
Utilization into practice

Course objectives

1. Describe the characteristic of quantitative and qualitative research methods
2. Describe the way research, education and practice relate to each other
3. Identify the importance of critical thinking
4. Identify the steps of critical reading
5. Identifying the criteria for critiquing research
6. Identify the criteria for research design

11 Advanced Principles of Anesthesia II

CanMEDS: expert

Anesthetic principles associated with specific specialty procedures; management of identified patient groups and patients with special problems.

Major topics

Cardiovascular procedures, thoracic procedures, plastic surgery, ophthalmic procedures, neurological procedures, fiberoptic intubation, CVP insertion, trauma, genitourinary procedures.

Course objectives

1. Synthesize appropriate and safe anesthetic management plans based on the patient's age, pathophysiology, and surgical procedure
2. Differentiate anatomical and physiological features, equipment issues, and pharmacological considerations unique to pediatric patients
3. Differentiate anatomical and physiological features and pharmacological considerations associated with geriatric patients
4. Demonstrate features of collaboration, workplace – and team organisation as well as ethical and professional aspects

4. Semester

12 Advanced Principles of Anesthesia III

CanMEDS: all roles

Anesthetic principles associated with specific specialty procedures and management of identified patient groups and patients with special problems.

Major topics

Day surgery and off-site anesthesia, regional anesthesia, obstetrical anesthesia, obesity/bariatric procedures, burns and critical care.

Course objectives

1. Synthesize appropriate and safe anesthetic management plans based on the patient's age, pathophysiology, and surgical procedure
2. Differentiate surgical and equipment issues, monitoring, and pharmacological considerations unique to the procedures presented
3. Differentiate anatomical and physiological features and positioning considerations associated with procedures presented
4. Identify issues of collaboration, communication and teamwork, as well as ethical and professional considerations

13 Bachelor's thesis project

CanMEDS: scholar

Continued development of Bachelor's thesis under faculty guidance

Course objectives

See research theory

5. Semester

14 Economics and Organization

CanMEDS: manager

Students are presented content in order to advance their knowledge of the evolution, organization, development of health policy, and the economics and financing of the health care system.

Major topics

National health policy organisation
Policy making principles
Financing issues

Course objectives

1. Analyze the organization, interrelationships among components, and function of the health care system
2. Analyze contemporary health care issues related to cost

control, distribution of services, health policy development, and access to care

15 Bachelor's thesis project

CanMEDS: scholar
Continued development of Bachelor's thesis under faculty guidance

Course objectives

Presentation of the thesis

Clinical Practice

Clinical practicum is in simulation labs, hospital and/or day surgical sites with qualified instruction in the clinical management of patients receiving various types of anesthesia. Each practicum builds on previously developed skills progressing from basic operating room orientation to the administration/participation of anesthesia for patients with complicated pathophysiology. The focus is on preparation, planning, and implementation of a safe anesthesia, and application of prior classroom learning. Specialty areas and regional anesthesia are incorporated. Teamwork, communication, collaboration, and education are stressed as well as organizational and scholarly aspects in order to meet the IFNA standards, described within the CanMEDS framework. Course work in practice contains case studies, participation in journal clubs, direct observational performance evaluations, teaching others and learning process evaluations.

Evaluation

Effective evaluation tools should reflect the increased complexity of cases as progress is made through the program. The clinical instructors complete an evaluation after each clinical period (formative evaluation) and the total grade is calculated and conferred by the course instructor from the semester total evaluations (summative evaluation). The clinical practicum can be graded as Satisfactory (S) or Unsatisfactory (U).

Duration

Clinical practicum should be as close to 50% of the total education as possible

Clinical Practice I

1. Vigilance in the delivery of patient care
2. Protection of patients from iatrogenic complications
3. Participation in the positioning of patients to prevent injuries
4. Utilization of standard precautions and appropriate infection control measures

Clinical Practice II

1. Conduction of a comprehensive and appropriate equipment check
2. Provision of care throughout the perianesthetic continuum

3. Utilization of a variety of current anesthesia techniques, agents, adjunctive drugs, and equipment while providing anesthesia
4. Administration/participation of general anesthesia to patients of all ages and physical conditions for a variety of surgical and medically related procedures
5. Delivery of culturally competent perianesthetic care
6. Performance of preanesthetic assessments and formulation of an anesthesia care plan
7. Identification and application of appropriate action when confronted with anesthetic equipment-related malfunctions
8. Communication and collaboration with all members involved in the peri-operative process

Clinical Practice III

1. Administration or assistance at administration and management of a variety of regional anesthetics, trauma, thoracic and neuro - surgery
2. Application of theory to practice, decision-making and problem solving
3. Provision of non-physician anesthesia care based on sound principles and research evidence
4. Interpretation and utilization of data obtained from noninvasive and invasive monitoring data
5. Calculation, initiation, and management of fluid and blood component therapy

Clinical Practice IV

1. Provision and assistance of anesthesia services to all patients, including trauma and emergency cases
2. Function as a resource person for airway and ventilation management
3. Communication and collaboration with all members involved in the peri – operative process
4. Application of theory to practice, decision-making and problem solving
5. Provision of nurse anesthesia care based on sound principles and research evidence

Clinical Practice V

1. Participation in all anaesthesia techniques, surgical procedures in patients of all ages and co - morbidities
2. Function within appropriate legal requirements, accepting responsibility and accountability for practice
3. Self-evaluation, self-learning and teaching others
4. Participation in continuing education activities to acquire new knowledge and improve practice
5. Understanding sound principles of anesthesia risk management to include preventive and procedural

strategies

Clinical Practice VI

1. Participation in activities that improve anesthesia care
2. Function within appropriate legal requirements, accepting responsibility and accountability for practice
3. Self-evaluation, self-learning and teaching others
4. Participation in continuing education activities to acquire new knowledge and improve practice
5. Understanding sound principles of anesthesia risk management to include preventive and procedural strategies
6. Presentation of organized and clear evaluations and critiques of research, journal articles, and case presentations.
7. Clinical examination

6. Semester

16 Review

CanMEDS: all roles

Review of the chemistry & physics, pathophysiology, pharmacology, physiology, and management principles associated with anesthesia care

Activities

The students will develop, organize and present an analysis of assigned topics on anesthesia management. The student will do a written examination such as e.g. multiple choice questionnaire
These will be graded:

Satisfactory (S) / Unsatisfactory (U)

Grades will be based on successful completion (minimum 65% score) of a comprehensive examination (Written and oral).

Satisfactory = 65% - 100%

Unsatisfactory = less than 65%

Course objectives

1. Contribute to class review of anesthesia management principles
2. Demonstrate integration of anesthesia management concepts in all areas practice

Appendix I

https://en.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System

The **ECTS, European Credit Transfer System**, is a credit system first introduced in Europe in 1989 within the educational exchange program Erasmus. However, the **ECTS** is now widely used throughout higher education institutions as it facilitates student mobility within Europe and the comparison of study programs and courses.

How does the ECTS benefit students?

The **ECTS** is a learner-centered system based on the student workload required to achieve a certain course outcomes. The workload refers to the amount of time a student needs to complete the learning activities, such as self-study, seminars, projects or exams, to achieve the course outcomes.

The credits can be attached to study programs, courses or even modules within a course. Furthermore, students can accumulate credits and pass them over to other institutions to continue with their studies. Therefore, the **ECTS** is also referred to as European Credit Transfer and Accumulation System.

The use of the **ECTS** by institutions is not compulsory. However, if you plan to study in **Europe**, you will notice the majority of institutions provide students with the number of **ECTS** each course and module is worth.

How many ECTS is an academic year worth?

A full-time student would need to complete **60 ECTS** per academic year, which represents about 1,500 to 1,800 hours of study. According to the ECTS, study programs in Europe are worth the following number of credits:

- Bachelor's degrees (first cycle) are worth **180 - 240 ECTS** (3 to 4 years)
- Master's programs (second cycle) are worth **60 - 120 ECTS** (1 to 2 years)
- PhD studies (third cycle) have no ECTS range

You may read further information about the ECTS on the [European Commission website](#) about the ECTS System or by downloading the ECTS User's Guide.

Appendix II

List of credits given in one year in European countries

https://en.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System

Country	Credit Points per year	Hours per Credit Point	Credit point name 1 "()"s.
Austria	60	25	ECTS (<i>also</i> ECTS-Punkte, ECTS credits)
Belgium	60	25-30	ECTS (<i>also</i> studiepunten, ECTS)
Bosnia and Herzegovina	60	25	ECTS bodovi
Bulgaria	60	25-30	кредити
Croatia	60	25-30	ECTS bodovi
Cyprus	60	30	ECTS
Czech Republic	60	~26	kredity
Denmark	60	~28	ECTS-point
<u>EFTA Member States</u>			
England, Wales and Northern Ireland	120	~15	Credits (Open University – points). Two England/Wales/Northern Ireland credits are equivalent to one ECTS credit. ^[2]
Estonia	60	26	Ainepunkt (EAP). Currently because many students are still used to the older system the longer name 'euroopa ainepunkt' is more often used for clarity's sake
<u>EU Member States</u>			
European Union (EU)	60	25-30	ECTS-Credits
Finland	60	27	opintopiste (op) / studiepoäng (Swedish)
France	60	29	crédits ECTS
Georgia	60-65	30	□□□□□□ (krediti)
Germany	60	25-30	ECTS, Leistungspunkte (LP), Kreditpunkte (KP), Credit Points (CP) or Credits
Greece	60	30	ECTS, Credit Points (CP), Μονάδες Φόρτου Εργασίας (Διδακτικές Μονάδες - Δ.Μ) or Credits
Hungary	60	30	kredit(pont)
Iceland	60	25-30	einingar (<i>units</i>)
Ireland	60		ECTS
Italy	60	25	crediti formativi universitari (CFU)
Latvia	40	40	kredītpunkts (KP)
Liechtenstein			
Lithuania	60	40	kreditai
Luxembourg	60		ECTS

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List of credits given in one year in European countries

https://en.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System

Country	Credit Points per year	Hours per Credit Point	Credit point name 1 "()"s.
Macedonia	60		кредити (ECTS)
Malta	60	25	ECTS-credits
Montenegro	60		ECTS-krediti
Norway	60	25-30	studiepoeng
<i>Other European Countries</i>			
Poland	60	25-30	punkty ECTS, eceteesy
Portugal	60	28	créditos
Romania	60	30	credite (SECTS)
Scotland	120	10 ^[3]	SCQF credit points
Serbia	60		ЕСПБ бодови
Slovakia	60		kredity
Slovenia	60		kreditne točke
Spain	60	25	créditos ECTS
Sweden	60	26.667	högskolepoäng (Used from July 2007)
Switzerland	60	30	ECTS-credits
The Netherlands	60	28	studiepunten (ECTS or EC)
Turkey	60	25-30	AKTS-Kredisi
Ukraine	60	30	кредити