International Federation of Nurse Anesthetists

MODEL CURRICULUM

24 MONTH MASTER'S DEGREE PROGRAM

Approved: May, 2014

Revised: May 2016

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Introduction
Master's degree nurse anesthesia programs are offered by universities* at post- graduate level. They require a heavy student workload covering at least two full-time calendar years. The length of the program is necessary for students to complete all learning activities and achieve the expected outcomes.

The issue of credits
There is a wide variation of credit awarding and point systems worldwide. The European Credit Transfer System (ECTS) which varies even within Europe can be found in the appendix and it serves as an example only. Countries will use their own systems.

Location of the program
The master'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 nurse anesthetists who:

- Provide anaesthesia under indirect and/or direct supervision, independently and in cooperation with physician anaesthetists
- 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, suggested by IFNA, is a possible way to meet the IFNA graduate competencies as outlined in the *Educational Standards for Preparing Nurse Anesthetists*. 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 master's degree programs are:

- Completion of a basic nursing education program of at least 36 months in length.
- Nursing experience of at least one (1) year, preferably in an acute care setting
- An earned baccalaureate degree from an institution recognized or accredited by governmental or nongovernmental accreditation or quality assurance entity (if available)
- Ability to speak and write in the language of instruction

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
- Master thesis*
- All components of the assessment have to be passed to progress

Graduate Competencies

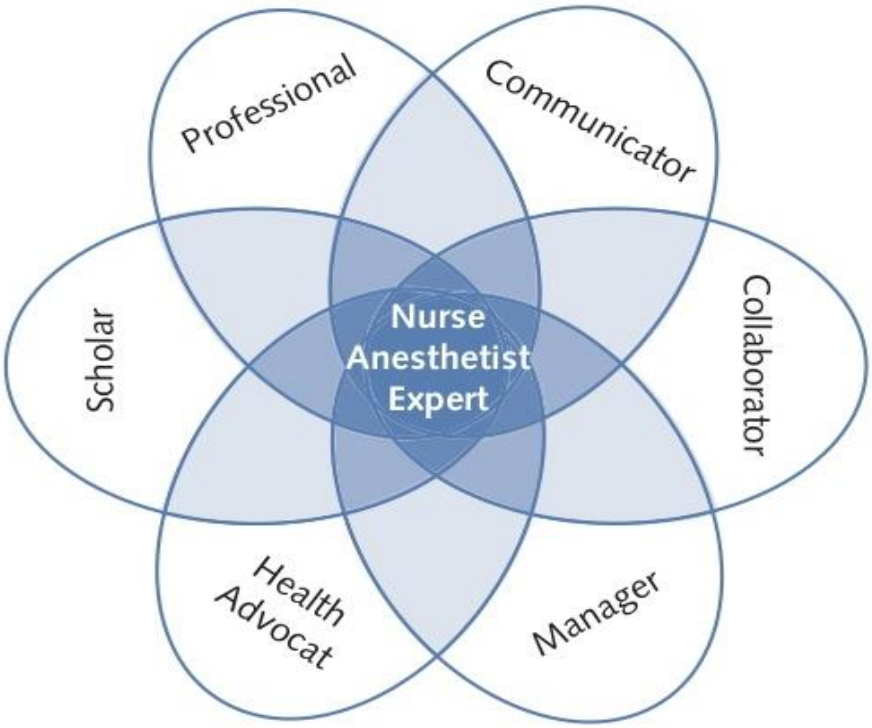
The IFNA graduate competencies (see IFNA graduate competencies as outlined in the *Educational Standards for Preparing Nurse Anesthetists*.) should be met at the end of the course

Course structure

The course at Master's degree level should last at least 24 months and consist of:

- Full time enrollment
- Extensive clinical experience
- Master's thesis (see assessment strategy)
- Comprehensive exam (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

(*) see glossary



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

Conceptual framework

To define the graduate competencies, required for safe practice, IFNA has adopted and adapted the well-known CanMEDS competency framework. 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 above)

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.

Courses

First Year

1. Semester

01 CanMEDS roles, ethical and legal aspects of nurse anesthesia

This course provides an analysis of nurse anesthesia history, professional associations and councils, legal aspects governing nurse anesthesia practice, hospital and governmental regulatory agencies, nurse anesthesia scope of practice, informed consent, cultural competency, and ethical and professional considerations relating to the nurse anesthesia profession.

Major Topics
History of nurse anesthesia, legislation of nurse anesthesia, scope of practice (standards) CanMEDS role model, professional regulation, ethics in nurse anesthesia, cultural issues, informed consent, issues of professional associations

Course objectives
At the end of the course students will be able to:

1. Describe the historical development of nurse anesthesia practice.
2. Analyze major legal and ethical issues related to the specialty
3. Describe the significance of scope of practice issues in nurse 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 Principles of Anesthesia

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

Basic principles of preoperative patient assessment, anesthesia planning, operating room preparation, interpretation of pertinent patient findings, and required documentation for safe anesthesia management.

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

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

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

03 Basic Science

CanMEDS: expert, professional

Applied sciences course that introduces the basic principles of chemistry, physics and neuroscience and the integration of these principles into the practice of nurse anesthesia.

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
Upon completion of this course the student will be able to:
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.

04 Anesthesia 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 the 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.

05 Physiology I

CanMEDS: expert

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

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

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.

Clinical Practicum I

2. Semester

06 Pathophysiology I

CanMEDS: expert

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

Major topics
Endocrine disorders, neurological diseases, respiratory diseases

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

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.

07 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
At the end of the course students will be able to:

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

08 Advanced Anesthesia Pharmacology II

CanMEDS: expert

Pharmacological effects, drug-receptor site interactions, therapeutic uses and adverse effects of agents used in the perioperative period.

Major Topics

Antacids, histamine antagonists, gastrointestinal prokinetics, anticoagulants, anti-platelet agents, thrombolytics, local anesthetics, autonomic pharmacology cardiovascular pharmacology, antiemetics and NSAIDS

Course objective

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

1. Explain the major principles of pharmacokinetics and pharmacodynamics as they relate to inhalational and intravenously administered drugs.
2. Analyze the mechanism of action and the pharmacologic effects of specific anesthetic agents
3. Analyze the mechanism of action and the pharmacologic effects of adjunctive agents used in the perioperative period such as anticoagulants, gastroprokinetic agents, diuretics, and antiemetics.

09 Research theory

CanMEDS: scholar

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

Course objectives

At the end of the course students are able to:

- Describe the characteristic of quantitative and qualitative research methods
- Describe the way research, education and practice relate to each other
- Identify the importance of critical thinking and how to problematize
- Identify the steps of critical reading
- Identify the criteria for critiquing research
- Demonstrate ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations

10 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
At the end of this course students will be able to:

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.

Clinical Practicum II

Second Year

3. Semester

11 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
At the completion of this course the student will be able to:

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.

12 Pharmaco-therapeutics
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.

13 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:
At the end of the course students will be able to:

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

14 Master thesis project

CanMEDS: scholar

Development of a clinical research project including a plan for implementation and evaluation.
Emphasis is on the application of ideas rather than original research.

Clinical Practicum III

4. Semester

15 Master thesis project

CanMEDS: scholar

Continued development of master's thesis under faculty guidance.

16 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.

Course objectives:

At the end of the course students will be able to:

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

17 Nurse Anesthesia Review

CanMEDS: all roles

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

Activities:

Each student will develop, organize and present an analysis of assigned topics on anesthesia management.

The final Satisfactory (S) / Unsatisfactory (U) grade will be based on successful completion (minimum 65% score) on a multiple choice comprehensive examination. Satisfactory = 65% - 100% Unsatisfactory = less than 65%

Course objectives

Students will:

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

Clinical Practicum IV

Clinical Practice

Clinical practicum is in simulation labs, hospital and/or day surgical sites with graduated 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 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.

Evaluation

Effective evaluation tools should reflect the increased complexity of cases as the students' progress 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 closed to 50% of the total education

Course objectives:

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. Conduction of a comprehensive and appropriate equipment check
5. Utilization of standard precautions and appropriate infection control measures
6. Provision of care throughout the perianesthetic continuum
7. Utilization of a variety of current anesthesia techniques, agents, adjunctive drugs, and equipment while providing anesthesia
8. Administration of general anesthesia to patients of all ages and physical conditions for a variety of surgical and medically related procedures
9. Provision of anesthesia services to all patients, including trauma and emergency cases
10. Administration or assistance at administration and management of a variety of regional anesthetics
11. Function as a resource person for airway and ventilation management
12. Delivery of culturally competent perianesthetic care
13. Application of theory to practice, decision-making and problem solving
14. Provision of nurse anesthesia care based on sound principles and research evidence
15. Performance of preanesthetic assessments and formulation of an anesthesia care plan
16. Identification and application of appropriate action when confronted with anesthetic equipment-related malfunctions
17. Interpretation and utilization of data obtained from noninvasive and invasive monitoring data
18. Calculation, initiation, and management of fluid and blood component therapy
19. Recognition and appropriate response to anesthetic complications that occur during the perianesthetic period
20. Effective communication and collaboration with all individuals contributing to perioperative patient care
21. Utilization of appropriate verbal, nonverbal, and written communication in the delivery of perianesthetic care
22. Participation in activities that improve anesthesia care
23. Function within appropriate legal requirements, accepting responsibility and accountability for practice
24. Self-evaluation, self-learning and teaching others
25. Participation in continuing education activities to acquire new knowledge and improve practice
26. Understanding sound principles of anesthesia risk management to include preventive and procedural strategies
27. Presentation of organized and clear evaluations and critiques of research, journal articles, and case presentations.

Glossary

Master's Thesis. A research study that a student designs (with the assistance of faculty), searches background literature, conducts the research, writes a thesis, and communicates results.

Portfolio. Collection of evidence proving that an individual has attained specific learning outcomes and competencies, which may be useful for current or potential employers.

University. Any type of higher education institution which, in accordance with national legislation or practice, offers recognized degrees or other recognized tertiary level qualifications, or vocational education or training at tertiary level.

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 (*also* ECTS-Punkte, ECTS credits)
Belgium	60	25-30	ECTS (*also* 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
		EFTA Member States	
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
		EU Member States	
European Union (EU)	**60**	**25-30**	**ECTS-Credits**
Finland	60	27	opintopiste (op) / studiepoäng (Swedish)
France	60	29	crédits ECTS
Georgia	60-65	30	კრედიტი (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 *(units)*
Ireland	60		ECTS
Italy	60	25	crediti formativi universitari (CFU)
Latvia	40	40	kredītpunkts (KP)
Liechtenstein			
Lithuania	60	40	kreditai
Luxembourg	60		ECTS
Macedonia	60		кредити (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.
Malta	60	25	ECTS-credits
Montenegro	60		ECTS-krediti
Norway	60	25-30	studiepoeng
		Other European Countries	
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

American Credit System

They are 'credit hours' versus 'contact hours'
One credit hour equals 15 contact hours.
A 4 **credit** hour course means there are 4 **contact** hours of instruction each week.
Example: 4 hours per week x 15 weeks = 60 contact hours for a semester. (A semester is 15 weeks.)
The credit hours for clinical experience vary widely among programs. They are arbriatry but all students must have 2,000 clinical contact hours.