



**University of
South-Eastern Norway**

Syllabus

Continuing education postgraduate level

Infection Prevention and Control

45 ECTS,

Autumn 2020

Faculty of Health and Social Sciences

Department of Nursing and Health Sciences

Curriculum

Autumn 2020	Spring 2021	Autumn 2021
<p>Microbiology for Healthcare Professionals</p> <p>15 ECTS</p>	<p>General infection control</p> <p>15 ECTS</p>	<p>Epidemiology and infection control in different clinical specialities</p> <p>15 ECTS.</p>

* Study program's name (English)

Infection Prevention and Control

Study direction

* Academic level

Continuing education postgraduate (Master) level

* Credits

45 ECTS

* Duration (number of semester)

3

* Study start

Autumn 2020

* Study place

Distance learning

* About this study direction

This study program enables students to understand the microbiological and environmental factors that contribute to the incidence, prevalence, transmission and control of Healthcare-associated infections. Students will acquire the relevant skills required to ensure effective infectious prevention and control, and to ensure patient and public health protection in terms of hygiene and infection protection.

* Admission requirements

The requirement for admission is bachelor's degree in health or biological sciences. Applicants who have been admitted to higher education on the basis of assessment of prior learning and work experience (realkompetanse-vurdering) in health or biological sciences.

* Relevance for employment and/or further studies

"No country, no health-care facility, even within the most advanced and sophisticated health-care systems, can claim to be free of the problem of health care-associated infections." [WHO 2016].

The demand for competent health professionals within the fields of hygiene and infection protection has increased considerably in recent years. Partly due to the high average age of workers in this field, as well as an expected increase in the need for this type of expertise. As of today, there is no equivalent relevant study in Norway or in the other Scandinavian countries.

This program is designed for nurses, physicians, sterile supply managers, and other healthcare professionals who have or will have an infection control responsibility. The program is also open to all with an interest in this subject area. The study is offered as a web-based education and therefore provides the flexibility to study in parallel with the job.

After successful study participants will be able to work in the primary and specialist health services, as well as in government agencies, private companies and in the industry.

* Learning outcomes

The individual subject plans within the study concretize what learning outcomes the students will achieve after completion of the course. Overall, the subjects will help students, after completing the program, have achieved the following learning outcomes:

KNOWLEDGE

The student:

- has advanced knowledge of the microbiological and environmental factors that contribute to the occurrence, propagation, transmission and control of infectious diseases
- has in-depth knowledge of various infectious diseases, vaccines and monitoring of those
- has in-depth knowledge and understanding required for effective infection prevention and control
- can use knowledge in the infection protection to enhance patient safety

SKILLS

The student:

- can prepare, implement and maintain an infection control program
- can ensure that patients are treated according to rules for the sustainable use of antimicrobial drugs
- can be a resource for colleagues and contribute to research and professional development in the field of hygiene and infection protection
- can analyze existing theories, methods and interpretations in the subject area and work independently with practical and theoretical problem solving
- includes user perspective and user involvement in decisions

GENERAL COMPETENCE

The student:

- can contribute to critical assessment and further development of own practice
- can apply knowledge and skills in new areas to carry out advanced tasks and projects
- can work in interdisciplinary teams with respect for the expertise of other professional groups and contribute to a high-quality healthcare service
- can communicate on academic issues, analyzes and conclusions in the field, with specialists, other employees and the public

* Learning activities

The study program is essentially so-called "asynchronous", which means that parts of the study activities are independent of time and place. There will be a clear structure and organization of content, learning activities and work requirements.

All subjects will have mandatory work requirements that must be done along the way, e.g. reflection tasks. In some of the assignments, the student must relate the subject to his or her own practice or by choosing examples. It is a requirement that students consider fellow students working along the way.

Each topic is designed according to the principles of effective learning, through storytelling, discussion, visible learning and community support.

Learn through storytelling:

Instead of broadcasting long classroom lectures, ideas and concepts are presented through videos and high-quality articles. Students can then discuss what they have learned, test new knowledge with quiz assignments (multiple choice tests) along the way, providing useful answers and the ability to retry if an answer is incorrect. Each course tells a story, step by step, with challenges and useful tips along the way, to test and build understanding.

Discussion for learning:

Online Forum Discussion

Through Online Forum Discussions, students can discuss with each other topics related to the topic. Students contribute to the discussion by posting messages to an online message board.

Coached Problem Solving

In Coached Problem Solving, students are working to solve a problem by using concepts that have been taught. The instructor facilitates and offers just-in-time coaching in each step of the problem-solving process.

Visible learning:

One way to improve your learning is to make the process visible so that the student knows how far it has come. The assignment list gives the student an overview of the course, shows the activities and records what the student has completed.

Community-supported learning

Community-supported learning can be a very creative process, while building team skills. Some collaborative learning activities that are being used are:

- Peer evaluation
- Problem-Based Learning
- Send-A-Problem

Practice

Not applicable

* Review and exam

See topic plans. Students can deliver their assignments in English, Norwegian, Danish, Swedish or German provided a minimum number of participants in each language group.

* Internationalization and student exchange

USN has established cooperation with universities and colleges in and outside Europe and facilitates student exchange through established mobility programs such as Erasmus and Nordplus. Student exchanges should preferably take place at institutions USN has established a cooperation with. If the student wishes to exchange with other institutions, the student must organize this and arrange for funding.

* Specific recognition

Teaching language is English.

Authorization/certification

Not applicable

* Evaluation of the study programme

The study will be regularly evaluated to maintain high quality. Students are expected to participate actively in evaluations, surveys, meetings and more to help raise the education quality of the study program. The evaluations are in line with USN's quality system.

* Course name (Norwegian)

Mikrobiologi for helsepersonell

* Course name (English)

Microbiology for Health Care professionals

* Course code

INF-1

* Course level

Master

* Scope (credits)

15 ECTS

* Language of instruction

English

* Number of semesters

1 semester

* Course summary

The course emphasizes the interaction of microorganisms with humans and the diseases they cause. This will enable nursing and allied health students to understand disease-causing representatives of different groups of microorganisms and how these are transmitted and controlled.

The course introduces the core concepts and basic principles in microbiology, examining microorganisms and how they interact with humans and the environment. Information regarding classification of microorganisms, characteristics of different cell types and processes critical for cell survival is presented. Topics such as bacterial metabolism, genetics, disease mechanisms, immune response, anti-microbial approaches and interaction of pathogenic microorganisms with humans are discussed. Infections of body systems are covered.

Bacteria

- Structure, nutrition, oxygen requirements
- Bacteria- gene expression I
- Protein Synthesis
- Gene Expression
- Bacteria - mobile genetic elements
- Bacteria - mutations
- Bacteria - gene transfer and recombination

Virus, fungi, protozoa, helminths and prions

- Virus- life cycle
- Virus- Viral Replication Curve
- Fungi of medical importance

- Medical parasitology-Protozoa
- Medical parasitology- Helminths
- Prions

Parasitism & host defenses

- Microbiome & parasitism
- The immune system
- Cells of the immune system
- Phagocytosis
- Pattern recognition in the innate immune system
- The complement system
- Inflammation and acute phase
- Interferons and viral infection
- Sepsis and Cytokine Storms
- The adaptive immune system

- Lymphoid tissue
- The cells of the adaptive immune system
- B cell activation
- Germinal centre response
- Antibodies
- Bridging the innate and adaptive immune systems

Conflicts between microbe and host

- Characteristics of infectious diseases
- Pathogenicity and Virulence (quantity)
- Entry, exit and transmission
- The logic behind isolation: incubation, latent and infectious periods
- How pandemics spread
- Antimicrobial peptides
- Acute-Phase Proteins
- Fever
- Natural Killer-Cell Activity
- Phagocytosis
- Interferons
- The Cell-mediated and Antibody-mediated Immune responses
- Spread and replication within the body
- Infection of distant target organs
- Parasite evasion
- Surviving phagocytosis
- Antigenic and phase variations
- Persistent viral infections

Respiratory tract-, urinary tract-, gastro-infections

- Respiratory tract infections
 - Immune defenses of the respiratory system
 - Laryngitis
 - Epiglottitis

- Pharyngitis
- Diphtheria
- Pertussis
- Pneumonia
- Tuberculosis
- Influenza
- Urinary tract infections
 - Cystitis
 - Pyelonephritis
- Gastrointestinal tract infections
 - GI overview
 - Clostridium difficile

Diagnostics

- The clinical microbiology laboratory
- Specimen processing
- Bacterial cultures
- Bacterial Isolation
- Microscopy
- Immunologic techniques
- ELISA
- The polymerase chain reaction (PCR)
- Sequencing
- Flow cytometry

Antimicrobial agents

- The history of penicillin
- Antibiotics-terminology
- Types of Pharmacodynamic Killing
- β -Lactam Antibiotics
- Aminoglycosides
- Macrolides
- Quinolones
- Tetracyclines
- Sulfonamides
- Antivirals
- Antimicrobial resistance
- Vaccines

Required prerequisite knowledge

BSc in Nursing, BSc in Biology, BSc in Medicine or similar

* Learning outcome

Upon completion of the course, the student:

KNOWLEDGE

- has thorough knowledge and can differentiate among the broad classes of microorganisms, including bacteria, protozoa, fungi, helminthes, and viruses
- has thorough knowledge in appropriate terminology of the structure, function and characteristics of prokaryotic and eukaryotic pathogens and viruses
- can apply knowledge to antimicrobial treatment, drug resistance and interaction with host
- has thorough knowledge in preventing infection and control in healthcare settings

SKILLS

- can identify strategies employed by antimicrobial drugs and how they specifically target certain pathogens.

GENERAL COMPETENCE

- can describe ways microbes can cause infection and pathology in humans.
- can communicate extensive independent work and masters language and terminology of the academic field

* Learning activities

Course x 400 hours - 15 ECTS			
Contact hours and study time (before and after)	# Teaching	Time factor	Workload
Online-Lectures	32,0	2,0	64,0
Online-Seminars	6,0	2,0	12,0
Total contact hours and study time			76,0
Curriculum	# Pages	Time factor	Workload
Curriculum (articles)	350,0	3,3	106,1
Curriculum (book chapters)	300,0	5,0	60,0
Total curriculum			166,1
Assessment and exam preparation	# Assessment	Time factor	Workload
Written exam	20,0	1,0	20,0
Preparation for exam	400,0	0,2	80,0
Total assessment and preparation for exam			160,0
Workload (hours)			402,1
Overtime (hours)			2,1

* Participation/compulsory work requirements

Each subject consists of several work requirements (mainly quizzes, but also peer-evaluation and others). Those work requirements will be evaluated with approved / not approved. All work requirements in a course must be completed and approved before the student can attend the exam in the course.

* Examination

Written exam - Open take-home assignment. The grading scale is A-F, where A-E is passed, and F is failed. The written exam will usually take place at the end of semester and the scope of the assignment is approx. 10 -20 pages, including appendices and notes but excluding table of contents and bibliography. Collaborative work is not allowed. The duration is 4 days.ome assignment. The grading scale is A-F, where A-E is passed, and F is failed.

*** Examination support material**

Module Graded Quizzes: all, Final Exam: all

*** Course evaluation**

The programme of study shall be regularly evaluated in order to maintain high quality. In order to help improve the educational quality of the programme of study, students are expected to actively participate in evaluations, questionnaires, meetings etc. The evaluations shall be carried out in accordance with USN's quality assurance system

Miscellaneous

The course lectures are provided on a Canvas platform. The course is organized as an asynchronous, module based (serial) course. Teacher support in module forums.

The student must have reliable access to a computer connected to the internet. Students using Windows-based computers should have Windows 10, Windows 8, Windows 7, Windows Vista or Windows XP. Mac users must have Mac OS 10.6 or later. Other operating systems may not support the web browsers and other software necessary for your participation in online course material.

*** Literature (reading list)**

Textbook:

Mims' Medical Microbiology
5th Edition

Authors: Richard Goering Hazel Dockrell Mark Zuckerman Ivan Roitt Peter Chiodini

Paperback ISBN: 9780808924401

eBook ISBN: 9780702050299

Other materials: Notes & publications provided online

*** Approved course plan (date, name, title)**

* Course name (Norwegian)

Generelt smittevern

* Course name (English)

GENERAL INFECTION CONTROL

* Course code

INF-2

* Course level

Master

* Scope (credits)

15 ECTS

* Language of instruction

English

* Number of semesters

1 semester

* Course summary

Infection prevention & regulations

- Burden of HAI.
- Responsibility.
- IC personnel.
- Regulations, organisation and elaborating
- Laws, Regulations, and Infection Prevention.
- Important actors in the field of infection control.
- Municipal responsibility.
- Responsibilities in primary health care.

Organisation of infection prevention and control

- Organisation of infection prevention and
- WHO Core components
- ECDC Core components
- Components crucial to effective infection control in hospitals.

- Essential partners of IPC organisation.
- Role of the central sterilization service.
- IC in primary health care.
- IP Plan.
- The IP and Organizational Structure.
- Hospital size.

Elaborating infection control interventions

- Elaborating infection control interventions
- Prerequisites: Organisation of infection prevention and control
- Managing Complex IPAC Issues.
- Implementing IC.
- Patient engagement.
- Audits

Hand Hygiene

- Ignaz Semmelweis - Pioneer and Visionary in Medicine.
- Epidemiological significance of hands - resident microbiota & transient microbiota
- Survival times of microbes on hands.
- Rings, wrist clocks and artificial fingernails.
- Transmissibility of microbes from hands.
- MRSA and the skin.
- Hygienic hand disinfection.
- Surgical hand disinfection.
- 5 moments for hand hygiene.
- Selection of products for surgical hand preparation.
- Hand washing.
- Hand washing and spores.
- Alcohol based handrubbing
- Glove use and the need for hand hygiene.
- Sterile surgical gloves.
- Contact dermatitis.
- Skin care
- Hand Hygiene and AMR.
- Hand Hygiene in home care and long term care facilities.

Antisepsis

- Principles of Asepsis.
- Origin of antiseptics.
- Groups of antiseptics.
- Skin antiseptic.
- Chlorhexidine.
- Resistance to chlorhexidine .
- Triclosan.
- Povidone-Iodine.
- Alcohol.
- Hydrogen Peroxide.

Environmental cleaning and disinfection

- Physical disinfection.
- Chemical disinfection.

- Phenol.
- Aldehydes.
- Quats.
- Halogens.
- Oxidizing agents.
- Methods cleaning and disinfection.
- Surface risk assessment.
- Grey zones of cleaning.
- Cleaning Hospital Room Surfaces to Prevent HAI
- Virus inactivation.
- Norovirus.
- Cleaning wipes.
- Disinfectants in the environment.
- Monitoring Cleaning in Healthcare Facilities.

Sterilisation

- Basics of sterilisation
- The role of reprocessing in infection control and prevention.
- Steam sterilization.
- Low-Temperature and plasma sterilization.
- Dry heat sterilization.
- Radiation sterilization.
- Kill kinetics.
- Decimal reduction time.
- Thermal death time.
- Endotoxins.

Risk assessment of medical devices

- Spaulding classification system.
- EN ISO 14971:2012.
- The Safety of Reprocessed Medical Devices Marketed for Single-Use.
- Risk assessment if there are student

Isolation

- Isolation in Healthcare .
- Standard precautions.
- Transmission-based precautions.
- Contact precautions.
- Droplet precautions.
- Airborne precautions.

- European Union Standards for Tuberculosis Care

Prophylaxis

- Employee & patient protection.
- Vaccines
- Herd immunity.

Influenza vaccination in healthcare workers if there are student submissions

- Post-exposure prophylaxis HIV.
- Post-exposure prophylaxis HCV.
- Personal protective equipment.
- ECDC Tutorial on the safe use of personal protective equipment .
- Bedpan Management.

Antimicrobial stewardship

- The Principles of Antimicrobial Prescribing.
- Pharmacology of Antimicrobials.
- Antibiotic allergies.
- Urinary tract infections.
- Community-acquired respiratory tract infections.
- Skin and soft tissue infections.
- Bloodstream infections.
- Antimicrobial Surgical Prophylaxis.
- Acute pharyngitis in adolescents and adults.

- Acute Infectious Diarrhea.
- Ventilator-associated pneumonia.
- Acute Otitis media.

Central sterile supply departments (CSSD) and other supply and distribution units

- Risk minimisation in CSSD
- Internal control and process quality in CSSD
- Hospital laundry
- Hygienic ventilation & hygienic design
- Water supply
- Disposal
- Hygienic handling of pharmaceuticals

Device associated and infection common for different medical disciplines

- Injections & punctuations
- Catheter associated infections
- Ventilation associated infections
- Sepsis
- Endoscope associated infections
- Surgical site infection
- Infection and immunosuppression
- Implant associated infection
-

Required prerequisite knowledge

Course “Microbiology for Health Care professionals” or similar

* Learning outcome

Upon completion of the course, the student:

KNOWLEDGE

- has thorough knowledge of the concepts of infection prevention and control.
- can apply knowledge of the infection chain to infection prevention and control
- can describe workplace practices to protect the patient from healthcare-associated infections.
- should be able to identify the relevant legislative and standards applying for his/her work situation
- can apply knowledge of the infection chain to infection prevention and control
- does understand Hygienic Design principles

- can describe workplace practices to protect the patient from healthcare-associated infections.

SKILLS

- can discuss workplace practices designed to minimize the risk of healthcare workers' occupational exposures to infectious diseases.
- Can analyze and deal critically different types of disinfection methods

GENERAL COMPETENCE

- Identify healthcare-associated situations requiring enhanced infection control precautions
- can apply knowledge and skills of the concept of antibiotic stewardship in different clinical settings
- Can identify relevant regulations

* Learning activities

Course x 400 hours - 15 ECTS			
Contact hours and study time (before and after)	# Teaching	Time factor	Workload
Online-Lectures	32,0	2,0	64,0
Online-Seminars	6,0	2,0	12,0
Total contact hours and study time			76,0
Curriculum	# Pages	Time factor	Workload
Curriculum (articles)	350,0	3,3	106,1
Curriculum (book chapters)	300,0	5,0	60,0
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bibliography. Collaborative work is not allowed. The duration is 4 days.ome assignment. The grading scale is A-F, where A-E is passed, and F is failed.

*** Examination support material**

Module Graded Quizzes: all, Final Exam: all

*** Course evaluation**

The programme of study shall be regularly evaluated in order to maintain high quality. In order to help improve the educational quality of the programme of study, students are expected to actively participate in evaluations, questionnaires, meetings etc. The evaluations shall be carried out in accordance with USN's quality assurance system

Miscellaneous

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*** Literature (reading list)**

Textbook:

1. Fraise AP, Fraise AP, Bradley C. *Ayliffe's Control of Healthcare-Associated Infection a Practical Handbook*. 5th ed. London :: Hodder Arnold; 2009.
2. Fraise A, Fraise AP, Maillard J-Y, Sattar S. *Russell, Hugo & Ayliffe's Principles and Practice of Disinfection, Preservation, and Sterilization [electronic Resource]*. 5th ed. Chichester, U.K. :: Wiley-Blackwell; 2013.
3. Andersen BM. *Prevention and Control of Infections in Hospitals : Practice and Theory*. New York, NY: Springer Nature Switzerland AG; 2019.

Other materials: Notes & publications provided online

*** Approved course plan (date, name, title)**

* Course name (Norwegian)

Epidemiologi og smittevern i forskjellige arena

* Course name (English)

Epidemiology and infection control in different clinical disciplines

* Course code

INF-3

* Course level

Master

* Scope (credits)

15 ECTS

* Language of instruction

English

* Number of semesters

1 semester

* Course summary

Epidemiology is a basic science of public health. Epidemiological studies offer considerable benefits to the way Health Professionals incorporate health-related practices into their professional role. This course provides the basic terms and concepts of epidemiology.

Infectious Diseases Epidemiology

Epidemiology Key Terms.

- Population.
- Determinants.
- Disease events in populations.
- Concepts of Disease Occurrence .
- Agent, Host & Environment.
- Endpoint in IPC studies.
- The chicken or the egg dilemma.

Descriptive & analytical epidemiology

- Descriptive epidemiology.
- The five W's.
- Analytical epidemiology .
- True or wrong hypothesis ?.
- Randomization.
- Study design.
- Cohort study.
- Case-control study.

Biostatistics

- Data & variables.
- Central tendency.
- Calculating Frequencies & Rates.
- Main measures of disease frequency.
- Prevalence & incidence
- Relative Risk.
- Odds ratio.
- Correlation & Regression
- Null-hypothesis.
- p-value & confidence intervall.
- p-value and alpha.
- Significance tests
- Relative risk and CI

Data collection

- Why collecting data .
- EHR-electronic health record system .
- Electronic Health Data.
- Public electronic Health Data.
- Surveillance and disease data from ECDC.

- Questionnaires
- Displaying Public Health Data.

Metaanalysis & Sytematic reviews

What is a systematic review?.
Statistical procedures in a Meta-analysis.

Outbreak investigation

- Components of Initial Outbreak Investigations .
- Patterns of disease-development in a populatIon.
- Basic Reproduction Number
- Patient Care Activities & Environmental Sampling.

- Case-Control Analysis.

Infection control epidemiology of selected microorganism

- Epidemiology of MRGN.
- Multidrug resistant organisms (MDRO) - infection control strategy.
- Epidemiology of viral infections.
- Epidemiology of MRSA, VISA & VRSA.
- Epidemiology of VRE.
- Epidemiology of Chlostridium difficile.
- Epidemiology of fungal infections.

Furthermore, has each medical discipline specific challenges related to its field. In this module, we introduce specific infection control issues related to:

- **Critical Care Units**
- **Surgery & Anaesthesiology**
- **Oncology & Radiology**
- **Obstetrics & Paediatrics & Ophthalmology**
- **Homecare & rehabilitation**

Required prerequisite knowledge

BSc in Nursing, BSc in Biology, BSc in Medicine or similar

* Learning outcome

Upon completion of the course, the student:

KNOWLEDGE

- has thorough knowledge and understanding of epidemiological methods
- has advanced knowledge of the main types of epidemiological studies
- can provide examples of microorganism specific epidemiology

SKILLS

- can apply knowledge in a range of infection control-related issues

GENERAL COMPETENCE

* Learning activities

Course x 400 hours - 15 ECTS			
Contact hours and study time (before and after)	# Teaching	Time factor	Workload
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* Examination support material

Module Graded Quizzes: all, Final Exam: all

* Course evaluation

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Textbook:

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2. Andersen BM. *Prevention and Control of Infections in Hospitals : Practice and Theory*. New York, NY: Springer Nature Switzerland AG; 2019.
3. Andersen BM. *Prevention and Control of Infections in Hospitals : Practice and Theory* /. Cham, Switzerland :: Springer,; 2019.

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