

BS001 : Air Physiology

Titular:

LCL (Land) Salvatore Lo Bue (3 ECTS)

ECTS: 3

Contact hours: 20 hr(s) theory ; 10 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

Chapter 1 : General introduction + atmosphere (1 hr classroom lecture)

Chapter 2 : Respiration and circulation (2 hrs classroom lecture)

Chapter 3 : Hypoxia and the influences of decreased partial pressure of oxygen (4 hrs classroom lecture)

Chapter 4 : Influences of changes in barometric pressure (1 hr classroom lecture)

Chapter 5 : Noise and vibrations (1 hr classroom lecture)

Chapter 6 : Health Hygiene and physical condition for aviators (1 hr classroom lecture)

Chapter 7 : Spatial disorientation and illusions (2 hrs classroom lecture)

Chapter 8 : Accelerations (4 hrs classroom lecture)

Chapter 9 : Ejections (2 hrs classroom lecture)

Chapter 10 : Airsickness (1 hr classroom lecture)

Chapter 11 : Decompression sickness and explosive decompression (2 hrs classroom lecture)

Chapter 12 : Thermal stress (1 hr classroom lecture)

Chapter 14 : Vision and night vision (2 hrs classroom lecture)

Chapter 15 : Nervous system (1 hr classroom lecture , not instructed in 2008)

Chapter 16 : Sleep, fatigue and circadian rhythm (2 hr classroom lecture)

Chapter 17 : Tropical missions (1 hr classroom lecture)

Chapter 18: Aeromedical Evacuation

Following Learning Objectives (LO) ATPL will be covered during the course :

040 01 00 00 HUMAN FACTORS: BASIC CONCEPTS

040 02 01 00 Basics of flight physiology

040 02 01 01 The atmosphere

040 02 01 02 Respiratory and circulatory system
040 02 01 03 High-altitude environment
040 02 02 00 Man and environment: the sensory system
040 02 02 01 Central, peripheral and autonomic nervous systems
040 02 02 02 Vision
040 02 02 03 Hearing
040 02 02 04 Equilibrium
040 02 02 05 Integration of sensory inputs
040 02 03 00 Health and hygiene
040 02 03 01 Personal hygiene
040 02 03 02 Body rhythm and sleep
040 02 03 03 Problem areas for pilots
040 02 03 04 Intoxication
040 02 03 05 Incapacitation in flight

Final competences

- I. 1. Understanding of extensive academic subject matter in the field of Social and Military Sciences: BS
- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- V. 1. Working with people as an individual or in a group: Adapting to individual human behavior and group dynamics

Learning objectives

Remember: Describe basic principles of aeronautical physiology; List all influencing factors on the human body in flight
Understand: Explain how this influence on physiology can have an impact on the performance of the pilot.

This course meets the learning objectives described by the European Aviation Safety Agency (EASA) Part-FCL (Flight Crew Licensing) Airline Transport Pilots Licence (ATPL) learning objectives for the Human Performance (LOs 040 01 00 00-040 02 03 05 - Annex II to ED Decision 2016/008/R M. SUBJECT 040 ? HUMAN PERFORMANCE)

Required knowledge

Course material

Slides (digital)

References

Fundamentals of Aerospace Medicine, 3rd Edition (DeHart, 2002)
Ernsting's Aviation Medicine, 4th Edition (Ernsting, 2006)

Working methods

Ex Cathedra

Teaching Conversation

Class Discussion

BS002 : Air Psychology

Titular:

LCL (Land) Salvatore Lo Bue (3 ECTS)

ECTS: 3

Contact hours: 20 hr(s) theory ; 10 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

Chapter 1 : Introduction

Chapter 2 : Stress

Chapter 3 : Sleep

Chapter 4 : Cognitive psychology

Chapter 5 : Learning processes

Chapter 6 : Personality, individual differences and group behaviour

Chapter 7 : Communication and cooperation

Chapter 8 : Human factors in aviation safety

Teamwork : Paper and presentation

Following Learning Objectives (LO) ATPL will be covered during the course :

040 03 00 00 BASIC AVIATION PSYCHOLOGY

040 03 06 00 Human overload and underload

040 03 06 01 Arousal

040 03 06 02 Stress

040 03 06 05 Fatigue and stress management

040 03 01 00 Human information processing

040 03 01 01 Attention and vigilance

040 03 01 02 Perception

040 03 01 03 Memory

040 03 02 00 Human error and reliability

040 03 02 01 Reliability of human behaviour

040 03 03 00 Decision-making

040 03 01 04 Response selection

040 03 02 02 Mental models and situation awareness

040 03 05 01 Personality, attitude and behaviour

040 03 05 02 Individual differences in personality and motivation

040 03 04 02 Coordination (multi-crew concepts)
040 03 04 03 Cooperation
040 03 04 04 Communication
040 03 02 03 Theory and model of human error
040 03 02 04 Error generation
040 03 04 00 Avoiding and managing errors: cockpit management
040 03 05 03 Identification of hazardous attitudes (error proneness)
040 03 07 00 Advanced cockpit automation

Final competences

I. 1. Understanding of extensive academic subject matter in the field of Social and Military Sciences: BS
IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
V. 1. Working with people as an individual or in a group: Adapting to individual human behavior and group dynamics

Learning objectives

To remember: Describe basic principles of aeronautical psychology; List all influencing factors on pilot performance before, during and after flight
To understand: Explain how this influence on performance can be counteracted by behavioural measures.

This course meets the learning objectives as described by the European Aviation Safety Agency (EASA) Part-FCL (Flight Crew Licensing) Airline Transport Pilots Licence (ATPL) learning objectives for the Human Performance (LOs 040 03 00 00-040 03 07 00 - Annex II to ED Decision 2016/008/R M. SUBJECT 040 HUMAN PERFORMANCE)

Required knowledge

BS001

Course material

Slides (digital)

References

Aviation Psychology and Human Factors (2nd Ed), By Monica Martinussen, David R. Hunter (2017)

Working methods

Ex Cathedra
Teaching Conversation
Class Discussion

BS904 : Cultural Dimensions of Operations

Titular:

HLR (Civ) Delphine Resteigne (3 ECTS)

ECTS: 3

Contact hours: 18 hr(s) theory ; 12 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

The aim of this course is to better understand the complexities of contemporary conflicts and of military operations conducted both in remote operational theaters as in homeland operations.

Based on case-studies related to contemporary military operations, this course will focus on the analysis of social and cultural dimensions surrounding the military environment and to what extent these dimensions exert a significant influence on the nature of the conflicts and on the approaches that are chosen in trying to resolve them.

In a first part, this provides an overview of key conceptual elements of military culture.

The second part looks at the practical implications of cultural dimensions in current conflicts. Cadets are divided into small groups of 2-3 students (TBD) and are allowed to choose one article (cleared by the Professor in the reader) that they would like to develop. They research the specific topic and then brief their findings to the class in a 30 minute presentation which is followed by a group discussion and additionally moderated by the Professor.

Final competences

I. 1. Understanding of extensive academic subject matter in the field of Social and Military Sciences: BS

II. 1. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: BS

III. 2. Applying language and communication skills efficiently:

Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

VIII. 1. Thinking and acting ethically: Giving a sound vision including a reflection on the social and ethical responsibilities

Learning objectives

The main goal of this course is to develop the cultural competences of future military leaders.

At the end of the course, cadets are expected to:

- Display a better understanding of the complexities of contemporary conflicts and the dynamics of military operations both in expeditionary operations and in homeland scenarios;
- Identify the implications of cultural dimensions on the operational environments;
- Display a greater awareness of the organizational and social dynamics that are key for having efficient military-civilian cooperation in operations;
- Display an ability to read, analyze, understand and then expose to the class key concepts from academic publications on military sociology;
- Display the ability to formulate a personal and critical, but founded, opinion on articles published in sociological literature, by developing a logic driven argument.

Required knowledge

BS615
BS726
CL618

Course material

Slides (digital)
Articles

References

Working methods

Ex Cathedra
Teaching Conversation
Class Discussion
Closed Tasks

BS907 : Citizenship and Military Ethics II

Titular:

CDT (Land) Michael Dewyn (3 ECTS)

ECTS: 3

Contact hours: 30 hr(s) theory ; 0 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

The main objective of this course is to undertake an advanced study of some of the issues and themes that were already to some extent examined in the Ba 2 course 'Citizenship and Military Ethics I'.

The 'Citizenship and Military Ethics II' course has two parts: a theoretical part (20 h) and a practice part (10 h).

The theoretical part of the course is divided into 10 two-hour sessions. During the first two-hour session a general practical and theoretical introduction will be given. During the 9 following two-hour sessions a journal article or a book chapter covering a specific issue or subject in the domain of citizenship and/or military ethics will be treated. During the first period of each two-hour session the students will be asked to prepare the text, during the next period the text will be discussed in class. The main purpose of this approach is to enhance as much as possible the interactive process in class. It is up to the students to determine what will be discussed in class.

The practice part of the course consists in individually preparing two articles. The individual preparation will be followed by an oral evaluation on the two articles.

Final competences

I. 1. Understanding of extensive academic subject matter in the field of Social and Military Sciences: BS

II. 1. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: BS

III. 2. Applying language and communication skills efficiently:

Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

VIII. 1. Thinking and acting ethically: Giving a sound vision including a reflection on the social and ethical responsibilities

VIII. 2. Thinking and acting ethically: Acting by considering his/her social and ethical responsibilities

Learning objectives

At the end of this course students are expected to be able to:

- analyze autonomously the central topics and arguments in journal articles and book chapters situated in the domain of citizenship and military ethics;
- make the necessary links between the arguments presented in the journal articles and the theoretical concepts studied in the 2Ba course "Citizenship & Military Ethics I";
- identify shortcomings in one's own understanding of the articles, and formulate the necessary questions in order to eliminate these shortcomings;
- illustrate the arguments and theories that were studied with own examples, and apply these insights in a proposed case-study;
- discuss the different positions and arguments in class with the teacher and other students;
- prepare, analyze and orally explain the central arguments and positions in two proposed texts: one on military ethics and another on citizenship (this assignment is linked with the practice part of the course)

Required knowledge

BS613
BS725

Course material

Articles

References

Bruno Coppieters, Carl Ceulemans & Nick Fotion (eds.), *Moral Constraints on War. Principles and Cases* (third edition), Lanham, Lexington Books, 2020.

Working methods

Teaching Conversation

CS021 : History of naval warfare

Titular:

MAJ (Land) Dave Warnier (3 ECTS)

ECTS: 3

Contact hours: 27 hr(s) theory ; 0 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

The course retraces the history of naval warfare from the classical antiquity to the contemporary period. It focuses on the importance and the use of navies. They were and still are instrumental as a means of protecting the essential Sea Lines of Communication that assure more than 90% of global trade. Additionally, in peace time navies are used as deterrents and as means of applying politico-military pressure, while during a war they shape the battlefield and support land and even air operations.

The history of naval warfare is divided in following periods, with more emphasis on 20th century warfare

- 1- Age of the galleys
- 2- Middle Ages
- 3- Rise of the age of sail
- 4- Golden age of sail
- 5- Steam and Ironclads
- 6- First World War
- 7- Second World War
- 8- Contemporary period

We follow the historical evolution of naval warfare in terms of technology, tactics and organization. The three main technological characteristics of a ship that shape that evolution form the red line throughout the course: structure, propulsion and fighting power of a ship. The context, the conduct and the consequences of important historical naval campaigns and battles are studied in greater detail. The course retraces the history of naval warfare from the classical antiquity to the contemporary period. It focuses on the importance and the use of navies. They were and still are instrumental as a means of protecting the essential Sea Lines of Communication that assure more

than 90% of global trade. Additionally, in peace time navies are used as deterrents and as means of applying politico-military pressure, while during a war they shape the battlefield and support land and even air operations.

The history of naval warfare is divided in following periods, with more emphasis on 20th century warfare

- 1- Age of the galleys
- 2- Middle Ages
- 3- Rise of the age of sail
- 4- Golden age of sail
- 5- Steam and Ironclads
- 6- First World War
- 7- Second World War
- 8- Contemporary period

We follow the historical evolution of naval warfare in terms of technology, tactics and organization. The three main technological characteristics of a ship that shape that evolution form the red line throughout the course: structure, propulsion and fighting power of a ship. The context, the conduct and the consequences of important historical naval campaigns and battles are studied in greater detail. The course retraces the history of naval warfare from the classical antiquity to the contemporary period. It focuses on the importance and the use of navies. They were and still are instrumental as a means of protecting the essential Sea Lines of Communication that assure more than 90% of global trade. Additionally, in peace time navies are used as deterrents and as means of applying politico-military pressure, while during a war they shape the battlefield and support land and even air operations.

The history of naval warfare is divided in following periods, with more emphasis on 20th century warfare

- 1- Age of the galleys
- 2- Middle Ages
- 3- Rise of the age of sail
- 4- Golden age of sail
- 5- Steam and Ironclads
- 6- First World War
- 7- Second World War
- 8- Contemporary period

We follow the historical evolution of naval warfare in terms of technology, tactics and organization. The three main technological

characteristics of a ship that shape that evolution form the red line throughout the course: structure, propulsion and fighting power of a ship. The context, the conduct and the consequences of important historical naval campaigns and battles are studied in greater detail. The course retraces the history of naval warfare from the classical antiquity to the contemporary period. It focuses on the importance and the use of navies. They were and still are instrumental as a means of protecting the essential Sea Lines of Communication that assure more than 90% of global trade. Additionally, in peace time navies are used as deterrents and as means of applying politico-military pressure, while during a war they shape the battlefield and support land and even air operations.

The history of naval warfare is divided in following periods, with more emphasis on 20th century warfare

- 1- Age of the galleys
- 2- Middle Ages
- 3- Rise of the age of sail
- 4- Golden age of sail
- 5- Steam and Ironclads
- 6- First World War
- 7- Second World War
- 8- Contemporary period

We follow the historical evolution of naval warfare in terms of technology, tactics and organization. The three main technological characteristics of a ship that shape that evolution form the red line throughout the course: structure, propulsion and fighting power of a ship. The context, the conduct and the consequences of important historical naval campaigns and battles are studied in greater detail. The course retraces the history of naval warfare from the classical antiquity to the contemporary period. It focuses on the importance and the use of navies. They were and still are instrumental as a means of protecting the essential Sea Lines of Communication that assure more than 90% of global trade. Additionally, in peace time navies are used as deterrents and as means of applying politico-military pressure, while during a war they shape the battlefield and support land and even air operations.

The history of naval warfare is divided in following periods, with more emphasis on 20th century warfare

- 1- Age of the galleys
- 2- Middle Ages
- 3- Rise of the age of sail

- 4- Golden age of sail
- 5- Steam and Ironclads
- 6- First World War
- 7- Second World War
- 8- Contemporary period

We follow the historical evolution of naval warfare in terms of technology, tactics and organization. The three main technological characteristics of a ship that shape that evolution form the red line throughout the course: structure, propulsion and fighting power of a ship. The context, the conduct and the consequences of important historical naval campaigns and battles are studied in greater detail.

Final competences

- I. 2. Understanding of extensive academic subject matter in the field of Social and Military Sciences: CS
- II. 2. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: CS
- III. 1. Applying language and communication skills efficiently:
Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these
- III. 2. Applying language and communication skills efficiently:
Communicating orally his/her conclusions, knowledge, and the rationale underpinning these
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach
- VI. 1. Acting autonomously: Shaping and regulating his/her own learning process in function of his/her results

Learning objectives

- At the end of the course, it is expected that students are able:
- to explain and to illustrate the importance of navies since ancient times to the present day
 - to outline and to distinguish in a structured manner the different technological, tactical and organizational evolutions throughout the history of naval warfare
 - to establish links or spot the differences between multiple historical naval campaigns or battles in a well reasoned manner
 - to extrapolate and apply technological, organizational and tactical historical precedents to possible future naval evolutions

Required knowledge

CL618

CS626
CS816
RS619

Course material

Notes (printed)
Slides (digital)
Hardware (laptop)

References

Jeremy BLACK, *Naval Warfare*, 2017, Rowman & Littlefield.
R. G. GRANT, *Battle at Sea*, 2010, Penguin.
Robert K. MASSIE, *Castles of Steel*, 2003, Random House.
James STAVRIDIS, *Sea Power*, 2017, Penguin.
Craig L. SYMONDS, *World War II at Sea*, 2018, Oxford University Press.

Working methods

Ex Cathedra
Demonstration
Class Discussion

CS961 : International Conflicts in Historical Perspective

Titular:

COL SBH (Land) Kris Quanten (6 ECTS)

ECTS: 6

Contact hours: 35 hr(s) theory ; 25 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 1

Weight daily work: 20

Weight exam: 40

Type of exam: Oral

Content

The core business of an officer is conducting operations, both in a national and international context. In order to assess the scope of contemporary conflicts, it is important that he is able to make a correct analysis of the conflict from a historical point of view beforehand. In this course, we will focus hereon and teach the student not only the knowledge, but also the necessary skills to help him with this. We will focus on some specific cases that are relevant for the Belgian Defence. In addition to a thorough analysis of the underlying causes of the Middle Eastern conflict, we will go deeper into the Sahel issue as well as Central Africa.

Final competences

I. 2. Understanding of extensive academic subject matter in the field of Social and Military Sciences: CS

II. 2. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: CS

III. 1. Applying language and communication skills efficiently:

Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these

III. 2. Applying language and communication skills efficiently:

Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach

IV. 2. Thinking critically and acting scientifically: Elaborating a research question with a critical and evidence-based approach

IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

Learning objectives

At the end of the course the student gets acquainted with the complex international environment in which he will have to operate. He is able to analyse and assess the root causes of a conflictual situation. Different cases are analysed from an historical point of view. The student gradually learns to expose the roots of a conflict and to understand which actors play a direct or indirect role. In addition to ex-cathedra lessons and discussions, the student must also write a paper containing an in-depth analysis of a chosen conflict, which he will present to his fellow students. Based on this working method, future officers will be able to analyse any possible conflict in a systematic, reasoned and objective way. The students regularly report on their research results both orally as well as in writing and engage in debate with teachers and other students about their findings.

By the end of the course, students :

1. In terms of substantive knowledge :

- a. Understand and explain the historical roots of international conflicts in general;
- b. Understand and explain the specific situation in the Middle East and the Sahel Region;
- c. Discuss a range of key concepts, theoretical explanations and historical events;
- d. Explain contemporary issues related with the situation in the Middle East and the Sahel Region;
- e. Explain possible future evolutions in the Middle East and the Sahel Region.

2. In terms of skills :

- a. Analyse, understand, synthesize, and apply core texts on international conflicts;
- b. Present the essence of a complex problem in a limited timeframe;
- c. Carry out independent, in-depth research using a wide range of sources;
- d. Report in writing in a scientifically appropriate style and based on a correct reference system;
- e. Effective public speaking, presentation and seminar-leading skills;
- f. Work in a small team.

Required knowledge

CS626
CS714
CS816
CS817
CS823

Course material

Notes (printed)
Slides (digital)
Articles

References

CLEVELAND (W), BUNTON (M), A History of the Modern Middle East,
Routledge, London, 2018

Working methods

Ex Cathedra
Class Discussion
Open Tasks

CS962 : Strategic Studies

Titular:

CDT (Air) Joachim Herpels (6 ECTS)

ECTS: 6

Contact hours: 32 hr(s) theory ; 28 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 2

Daily work: amount oral evaluations: 2

Weight daily work: 20

Weight exam: 40

Type of exam:

Content

Strategy in a VUCA world is neither simple nor easy. A good strategy requires a number of skills and competences. A professional needs to understand that formulating, articulating, evaluating or executing strategy is not an easy thing. A theory of strategy is not the simple application of a checklist or a cookbook solution that can be applied time after time. Especially in periods of great turmoil and change, the development of strategy becomes rather difficult. Understanding strategy development is then essential as junior officers are involved in the conduct and the execution of military operations/tasks in a national and international context, based on the strategy of states and organizations. In order to prepare them for these basic functions, they should be well informed about the strategic framework and the security environment of these operations.

This course explores the strategy of global powers and some of the world's most pressing and interesting political security issues that have an influence on the international security environment. This course will help students to get a better understanding of the what, how and why of strategy in a fast changing world, based on the study of a number of great strategists and their approaches.

Final competences

III. 1. Applying language and communication skills efficiently:

Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these

III. 2. Applying language and communication skills efficiently:

Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach
- IV. 4. Thinking critically and acting scientifically: Deciding on the grounds of critical thinking and an evidence-based approach
- V. 1. Working with people as an individual or in a group: Adapting to individual human behavior and group dynamics
- VI. 1. Acting autonomously: Shaping and regulating his/her own learning process in function of his/her results

Learning objectives

The aim of this course is to allow students at the end of their MA studies to synthesize and draw on all their acquired knowledge and skills in order to apply them to a complex, real-life policy problem.

A core element of the learning process and format is the presence of an “external client” who sets the main policy-advice task for the students at the start of the course. This course as such requires a high level of independence, time and information management as well as an impeccable level of professionalism and work ethics by all members of the team. A key emphasis will be placed on students’ immersion in and exchange with think tank debates in Brussels and with guest lectures organized by the students or by the teaching staff.

Students will work in the framework of group work and individual in-depth research using their leadership skills to lead a small team. The nature of the course as a Senior Seminar requires a high level of independent thought, academic maturity, intellectual curiosity and exchange of ideas of all team members. It also requires students to effectively work in think tank teams. A mature approach to teamwork, efficient division of labour, adherence to clear time lines and deadlines and the early resolution of potential conflicts between team members is essential. Teaching staff will serve as coaches to steer, help and think with the team in order to be able to answer the question of the client. Within this framework, it is of the utmost importance for junior officers to understand how complex security issues are and how apparently local issues are interconnected in a global context that requires a comprehensive approach and where global actors try to shape the actual security environment.

In order to achieve the objectives of the course the students will act autonomously individual and as group and will shape their own learning process by practicing a lifelong learning attitude. They will do this by providing a learning portfolio for the individual part, and a website for the groupwork. The groupwork for the website, the presentations and the final report will allow them to work with others individually and as a

group. The presence of the external client, expecting an outcome, will allow the students to communicate orally, the presentations, and in written, the website and the final report. All of the documents and presentations should show the presence of the necessary critically and scientific thinking skills, as described in the competences for this course.

Required knowledge

RS619
RS620
CS817
CS823

Course material

Book (owned)
Notes (digital)
Slides (digital)
Hardware (laptop)
Articles

References

Mandatory:

Comparative Grand Strategy by Th. Balzacq, P. Dombrowki and S. Reich, Oxford University Press, 2019.

Grand Strategy in 10 Words by S. Biscop, Bristol University Press, 2021.

Working methods

Ex Cathedra
Teaching Conversation
Class Discussion
Open Tasks

CS963 : Contemporary Security Issues

Titular:

MAJ (Air) Michaël Alexandre (6 ECTS)

ECTS: 6

Contact hours: 39 hr(s) theory ; 17 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 1

Weight daily work: 20

Weight exam: 40

Type of exam: Oral

Content

The military instrument is one of those available to a state for the implementation of its foreign policy. In this respect, young officers who may be sent abroad must be able to understand the behaviour of states in the context of international relations.

In order to prepare them for these first deployments in a national or international context, they must have a basic knowledge of the general framework of operations and the motivations behind Belgian policy choices in terms of its foreign and defense policy.

This course explores some of the world's most pressing and interesting political and security issues, which have an influence on the Belgian Security & Defence Policy.

The aim for students is to acquire some specific skills and tools needed to examine the international security environment as well as current challenges, their changing nature in a globalised world; and basic understanding of the most important international organisations dealing with international peace and security.

The course is divided in three sections.

- After a short review of the international relations basics, in the first part we will focus on the Belgian Security and Defence policy in light of current security issues and our commitment towards international organisations.

- In the second part, we will focus on the global risks and challenges, including emerging sources of insecurity that threaten the world (with a dedicated focus on Belgium),

- The course will end in part three with a reflection on contemporary issues and the Belgian Foreign and Security Policy.

Final competences

I. 2. Understanding of extensive academic subject matter in the field of Social and Military Sciences: CS

- II. 2. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: CS
- III. 1. Applying language and communication skills efficiently: Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these
- III. 2. Applying language and communication skills efficiently: Communicating orally his/her conclusions, knowledge, and the rationale underpinning these
- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach
- IV. 4. Thinking critically and acting scientifically: Deciding on the grounds of critical thinking and an evidence-based approach

Learning objectives

The overall objective of the course is to allow junior officers to contextualize the commitment of Belgian military assets in contemporary operations in the light of Belgian interests and the overall security situation; in order to enable them to guide their choices and decisions when fielded abroad.

Within this framework, it is of the utmost importance for junior officers to understand how complex security issues are and how seemingly local issues have global implications, which require a comprehensive approach.

The CS963 course develops their research, critical analysis, teamwork, presentation, public speaking, and essay writing skills.

By the end of the course, students will be able to

- Explain, categorise and illustrate the complexity of global risks and security issues as well as their consequences on international actors (based on knowledge of terms and concepts as well as models applicable to international security issues),
- Discuss and debate (by comparing, mapping, linking, and/or establishing the connections between them) contemporary security issues (after having identified and interpreted them),
- Explain the consequences of these security issues for the Belgian Security & Defence Policy,
- Carry out and present a simple research paper in the realm of Political Science (by identifying threats and actors, by illustrating and/or categorizing them, structuring the explanatory elements of their actions and developing hypotheses about their motivations and the likely future

of an identified security issue). By examining, understanding, synthesizing and applying core texts and/or academic-level documents on a specific contemporary risk or security issue in the context of this research; students will have the opportunity to train the skills needed to write their final research paper (TMA / MAP).

Required knowledge

CL618
CL629
CS714
CS817
CS823
RS619
RS620

Course material

Slides (digital)
Articles
Notes (digital)
Book (loan)

References

Handbooks:

International Security Studies, Theory and practice, 2nd Edition (2020),
Peter Hough, Shahin Malik, Andrew Moran & Bruce Pilbeam
ROUTELEDGE
ISBN : 978-0-415-73435-6

Global Insecurity, Future of global chaos and governance (2017),
Anthony Burke, Rita Parker
PALGRAVE - ISBN : 978-1-349-95144-4 / 978-1-349-95145-1(ebook)
Note: a PDF version is available on BelADL.

Both books must be read before the examination.

All the other documents will be provided by the course' holder (via BelADL).

Working methods

Ex Cathedra
Teaching Conversation
Closed Tasks
Open Tasks

DR001 : Maritime law

Titular:

CPV MAB (Nav) Kris De Donder (3 ECTS)

ECTS: 3

Contact hours: 27 hr(s) theory ; 0 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

The course offers an in-depth study of the law of the sea and the law of armed conflict at sea.

A number of provisions of the internal law that directly influence the activities of the naval component are studied as well.

The course focuses on a better understanding of legal rules that can and will influence the planning and execution of military operations

Final competences

I. 1. Understanding of extensive academic subject matter in the field of Social and Military Sciences: BS

II. 6. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: SC

III. 1. Applying language and communication skills efficiently:

Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these

III. 2. Applying language and communication skills efficiently:

Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

IV. 2. Thinking critically and acting scientifically: Elaborating a research question with a critical and evidence-based approach

Learning objectives

Having finished the course, the students are able to :

- think critically and to decide and take action in accordance with the legislation taught in a specific situation linked to maritime law;
- methodically plan and lead the operations under their responsibility, taking into account the applicable law;

- identify their rights and duties as members of the military community in an international environment (especially in a maritime context), in times of peace and during armed conflict;
- justify and defend the ethical standards, especially those applicable during an armed conflict;
- defend decisions made on the basis of the existing law.

Required knowledge

DR813

Course material

Book (owned)
Slides (printed)
Software
Articles

References

Working methods

Ex Cathedra

DS902 : Defence Economics

Titular:

GHL (Civ) Wally Struys (3 ECTS)

ECTS: 3

Contact hours: 27 hr(s) theory ; 0 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

Chapter I. Defence economics in a conflictive society

Chapter II. Defence funding in Belgium during the cold war and the hot peace

Chapter III. The effects of the Ukraine war on defence expenses

Chapter IV. The dual vocation of Defence: society and economy

Chapter V. Direct and indirect costs of military operations

Chapter VI. Economic aspects of recent and current defence equipment acquisitions

Chapter VII. The security awakening of the European Union

Final competences

I. 7. Understanding of extensive academic subject matter in the field of Social and Military Sciences: SE

II. 3. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: DS

VIII. 1. Thinking and acting ethically: Giving a sound vision including a reflection on the social and ethical responsibilities

Learning objectives

At the end of the Defence Economics course the student will be able to:

1. Understand all subjects related to defence and its economic aspects.

2. Define and describe the financial and budgetary aspects of Defence at national, NATO and European levels.

3. Analyse the causes of the relevant constraints.

4. Situate Defence in the Belgian and European economic and industrial environment

5. Analyse and explain the economic and budgetary aspects of the internal and external missions of Defence

Required knowledge

This course uses topics treated in the following courses:

- Ba 3 SSMW (Sem 1)
- DS812 Economic policy

Course material

Notes (digital)

Slides (digital)

Articles

References

Working methods

Ex Cathedra

Open Tasks

Class Discussion

DS905 : Management of the Public Sector and Defence

Titular:

LCL MAB (Land) Hans De Smet (6 ECTS)

ECTS: 6

Contact hours: 40 hr(s) theory ; 20 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 2

Daily work: amount oral evaluations: 0

Weight daily work: 20

Weight exam: 40

Type of exam: Oral, written

Content

The most important premise of this course is that public administration, and consequently public management matters. There is a tendency among the public to equate politics and governments only with recurrent events (e.g. elections) and with visible conflicts between politicians that generally shape major political and policy developments. These developments and the resulting activities are indeed important for governing a society, but there is a massive amount of activity involved in translating major decisions, expressed in laws and decrees, made by politicians into action, and in delivering public programs or services to citizens. Legislatures and political executives may pass all the laws they wish, but unless public managers and public administration execute those laws effectively, little or nothing will actually happen.

Politicians have the general duty and responsibility to take various decisions to govern a society, i.e. to allow a society to function properly. In this course, we study the different levels that intervene in the global process of public management and public administration.

In the first chapter, we elaborate on the concept of politics. We define the concept, starting with an etymological definition and a brief historical overview. Then we go deeper into the issue of political ideologies. Next, we concentrate on the notion of democracy and explore how civilians can participate in political life.

After having introduced some important issues related to political science, we deal with public governance in the second chapter. We start with elucidating the notion 'state' as the most important form of polity and political organization, and then further discuss two of the three basic organizations in a modern state: the parliament and the

government. We end the chapter by introducing the basic principle of budgetary law.

The third chapter deals with the bureaucratic executive branch (i.e. public administration, public managers and public servants). We first discuss the role of public administration in governing. Then we concentrate on the theories about public administration, and finally we give some reflections about the roles of public servants and the interactions between public servants and politicians.

In the fourth chapter, we explain the Belgian case. We will go deeper into the creation of the Belgian federal state as we currently know it and the impact of the most important state reforms on the functioning of the Belgian society. We then comment on the most important administrative reforms at federal level and end the chapter with a description of the public sector in Belgium.

In the final chapter of the course, we first elucidate the theoretical concepts with regard to internal control (i.e. the ICS-framework). We then outline the Belgian legal framework and finally clarify the ICS-step-by-step plan, using a concrete example of the Belgian Defense.

Final competences

- I. 3. Understanding of extensive academic subject matter in the field of Social and Military Sciences: DS
- II. 3. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: DS
- III. 1. Applying language and communication skills efficiently:
Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these
- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- IV. 2. Thinking critically and acting scientifically: Elaborating a research question with a critical and evidence-based approach
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach
- V. 1. Working with people as an individual or in a group: Adapting to individual human behavior and group dynamics

Learning objectives

After completion of the course, the student is expected to be able to
- understand, interpret and evaluate in an objective and critical way publications and media coverage about politics, public governance,

public administration and the typical Belgian case -historically and current evolution (including those about Defense)
- conceptual knowledge of terms, currents and theories of public management
- drafting of a report and oral presentation about the public administration and public governance of a municipality and apply the risk management concepts of Internal Control on a municipality project

Required knowledge

RS619

DS814

Course material

Book (owned)

Slides (digital)

References

Devos, C. (2012). Wat is Politiek? In C. Devos (Ed.), Een plattegrond van de macht. Inleiding tot politiek en politieke wetenschappen. (Tweede herziene ed., pp. 17-40). Gent: Academia Press.

Devos, C., Bouteica, N., Ossenblok, K., & Moens, P. (2017). Belgisch federalisme. Gent: Academia Press.

Heene, A. (2005). Copernicus en Beter Bestuurlijk Beleid: modellen voor hervorming van publieke organisaties. Gent: Universiteit Gent.

Heywood, A. (2013b). Politics. (4th revised ed.) London: Palgrave Macmillan.

Holzer, M. & Schwester, R. W. (2016). Public Administration. An Introduction. (Second ed.) New York: Routledge.

Van Hooland, B. (2003). Nieuw Publiek Management. Van Bestuurskunde tot Copernicus. Gent: Academia Press.

Working methods

Ex Cathedra

Teaching Conversation

Class Discussion

Closed Tasks

Open Tasks

DS951 : Supply Chain Management

Titular:

LCL (Air) Filip Van Utterbeeck (6 ECTS)

ECTS: 6

Contact hours: 30 hr(s) theory ; 30 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 2

Daily work: amount oral evaluations: 0

Weight daily work: 20

Weight exam: 40

Type of exam: written

Content

This course consists of 2 main parts. In part 1 we give an overview of classical quantitative decision support tools in the domain of management science such as spreadsheet modelling, linear and integer programming, decision making under uncertainty and multicriteria decision making. In part 2 we zoom in on supply chain management and look in more detail at specific decision support models for supply chain processes such as distribution and transportation, forecasting and inventory management.

Part 1: Decision Support Tools

1. Introduction
2. Linear programming: basic concepts
3. Linear programming: formulation and applications
4. What-if analysis for linear programming
5. Network optimization problems
6. Using binary integer programming to deal with yes-or-no decisions
7. Multicriteria decision making: the analytical hierarchy process

Part 2: Operations and supply chain management

1. Introduction
2. Lean supply chains
3. Logistics, distribution and transportation
4. Global sourcing and procurement
5. Forecasting
6. Inventory management

Final competences

- I. 3. Understanding of extensive academic subject matter in the field of Social and Military Sciences: DS

II. 3. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: DS

IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

Learning objectives

The student understands the existing quantitative decision support methods. He analyses and decides which ones to apply for which type of problem. He translates small- to middle sized realistic management problems into a spreadsheet model, and configures and uses the Excel solver software to find an optimal solution. He selects and applies the correct decision support tools to analyse supply chain problems in a military context.

Required knowledge

SC622

SC713

Course material

Book (loan)

Software

Slides (digital)

References

Frederick Hillier and Mark Hillier: Introduction to management science. A modeling and case studies approach with spreadsheets.

Working methods

Ex Cathedra

Teaching Conversation

Closed Tasks

Open Tasks

DS952 : Project and Program Management

Titular:

COL IMM (Land) Geert Letens (6 ECTS)

ECTS: 6

Contact hours: 50 hr(s) theory ; 10 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 2

Daily work: amount oral evaluations: 0

Weight daily work: 20

Weight exam: 40

Type of exam: Oral, written

Content

Defense is an organisation that is continuously confronted with unique and new situations. As a result, both our core and supporting activities require effective project management.

This course builds on the basic principles of project and program management as defined by the Body of Knowledge of the Project Management Institute (PMI).

Project Management:

1. Phases: initiation, planning, execution, monitoring, close out
2. Core Knowledge areas: Procurement, HR, Communication, Risk Management, Integration Management

Program & Portfolio Management within the Belgian Armed Forces

1. Role of the material manager
2. Acquisition process and Integrated Logistic Support
3. Life Cycle Costing

Practical sessions provide a profound understanding of time scheduling based on Critical Path Method and PERT

Students are assigned to real life projects to support the creation of an integrated project plan and the use of various templates and softwares

Final competences

II. 3. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: DS

I. 3. Understanding of extensive academic subject matter in the field of Social and Military Sciences: DS

Learning objectives

1. Factual and conceptual knowledge of the terminology and principles of Project & Program Management.
2. Being able to create a sound project charter to obtain a strong mandate when initiating a new project
3. Being able to develop an integrated project plan based on a real life project
4. Understanding of the role of the material manager, the importance of Acquisition Logistics, and the principles of Life Cycle Costing

Required knowledge

CL825

Course material

Slides (digital)
Book (loan)
Hardware (laptop)
Software

References

PMI Project Management Body of Knowledge
Internal Guidelines from the Armed Forces with regard to Material and Acquisition Management
Farr J., Life Cycle Costing, 2011

Working methods

Ex Cathedra
Demonstration
Class Discussion
Open Tasks

DS953 : Performance Optimization

Titular:

COL IMM (Land) Geert Letens (6 ECTS)

ECTS: 6

Contact hours: 44 hr(s) theory ; 16 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 2

Daily work: amount oral evaluations: 0

Weight daily work: 20

Weight exam: 40

Type of exam: Oral, written

Content

Knowing how to do more with less is a prerequisite for every manager within Defense. Sound decision making is key to optimise the performance of military services. The content of this course support these goals in two ways:

1. The course provides an overview of various modern management methods (Strategy, Performance Measurement, Process and Risk Management) and change and improvement management approaches (ICS, ISO 9000, Lean Six Sigma, Change Management)
2. The course includes a business game that illustrates the integrated character of decisions in organisations. This illustrates how decisions are the result of both formal and informal information flows that depend on tangible (structure, strategy) and intangible (culture, team dynamics) characteristics of organisations.

Final competences

VII. 1. Collaborating in a multidisciplinary environment: Collaborating beyond the borders of specific disciplines to reach a common goal

V. 1. Working with people as an individual or in a group: Adapting to individual human behavior and group dynamics

I. 3. Understanding of extensive academic subject matter in the field of Social and Military Sciences: DS

Learning objectives

1. Demonstrate the importance and the impact of tools and methods for process improvement within Defense
2. Being able to document and management processes and to formulate SMART objectives
3. Make appropriate use of quantitative and qualitative tools to support decision making

The business game enables students to:

1. Assume a specific leadership role within an organisation (CEO, COO, CFO...)
2. Work together as a team to improve the performance of an organisation
3. Assess the impact of their actions on both the organisation and its members

Required knowledge

CL825

Course material

Slides (digital)

Book (loan)

Articles

References

AFSO21: Air Force SMART Operations 21, Playbook version D2.1

De Prins, Letens, Verweire, Six Batteries of Change, 2017

Working methods

Teaching Conversation

Class Discussion

Open Tasks

EP022 : Turbomachines

Titular:

LCL (Land) Bart Janssens (3 ECTS)

ECTS: 3

Contact hours: 20 hr(s) theory ; 10 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

This course treats the ATPL learning objectives regarding turbine engines, see section 021 11 of Annex I in

<https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2018001r>.

021 11 01 00 Basic principles

021 11 01 01 Basic generation of thrust and the thrust formula

021 11 01 02 Design, types components

021 11 01 03 Coupled turbine engine: design, operation, components and materials

021 11 01 04 Free turbine engine: design, components and materials

021 11 02 00 Main-engine components

021 11 02 01 Aeroplane: air intake

021 11 02 02 Compressor and diffuser

021 11 02 03 Combustion chamber

021 11 02 04 Turbine

021 11 02 05 Aeroplane: exhaust

021 11 03 00 Additional components and systems

021 11 03 01 Engine fuel system

021 11 03 02 Engine control system

021 11 03 03 Engine lubrication

021 11 03 04 Engine auxiliary gearbox

021 11 03 05 Engine ignition

021 11 03 06 Engine starter

021 11 03 07 Reverse thrust

021 11 04 00 Engine operation and monitoring

021 11 04 02 Starting malfunctions

021 11 04 03 Re-light envelope

021 11 05 01 Thrust, performance aspects and limitations

021 11 06 01 Design, operation, functions, operational limitations

Final competences

I. 9. Understanding of extensive academic subject matter in the field of Social and Military Sciences: ATPL

Learning objectives

- The students discuss the working principles of turbine engines, as stated in the EASA learning objectives above
- The students compare different engine types and components and cite their advantages and disadvantages
- The students fulfill all specific European Aviation Safety Agency (EASA) Part-FCL (Flight Crew Licensing) Airline Transport Pilots Licence (ATPL) ?learning objectives? as cited in the "Contents" above

Required knowledge

Course material

Book (owned)

References

Working methods

Ex Cathedra
Closed Tasks

EP901 : Propulsion of Military Platforms

Titular:

LCL (Land) Bart Janssens (3 ECTS)

ECTS: 3

Contact hours: 15 hr(s) theory ; 15 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral, written

Content

1. Propulsion systems
 - a. Propulsion systems criteria
 - b. Types of propulsion systems
 - c. Engine characteristics
2. Thermodynamics
 - a. Thermodynamic principles
 - b. Practical cycle calculations
3. Piston engines
 - a. Generalities
 - b. Connecting rod - crankshaft mechanism
 - c. Two- and four stroke engines
 - d. Engine components
 - e. Combustion process
 - f. Dynamics
 - g. Fuel supply, lubrication and cooling
4. Turbomachinery
 - a. Types of engines
 - b. Performance
 - c. Components

Final competences

- I. 4. Understanding of extensive academic subject matter in the field of Social and Military Sciences: EP
- II. 4. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: EP

Learning objectives

- Apply the principles of technical thermodynamics to engine cycles
- Explain the link between thermodynamics and the design of an engine

- Explain typical figures/values characterizing contemporary engines (e.g Compression ratio, specific fuel consumption, maximum temperatures, sizes...)
- Explain and motivate the choice of an engine type for a given application
- Identify the main components and accessories of an engine or power plant

Required knowledge

SC621

SC623

Course material

Notes (digital)

Slides (digital)

References

Working methods

Ex Cathedra

Closed Tasks

Open Tasks

EP903 : Energy

Titular:

LCL (Land) Maarten Vergote (3 ECTS)

ECTS: 3

Contact hours: 19 hr(s) theory ; 12 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

By means of actual numbers, we introduce the course with an overview of the energy problem of the world. Sustainability, renewability and other important phenomena like global warming, acid rain, etcetera, are cited one-by-one.

The world nowadays relies very much on energy to satisfy its actual material needs. The tendency is that in the future, the importance of energy will only grow for the next generations. Whether the energy needs are in terms of transport, heat or electricity, the analysis of the problem is addressed in the lectures.

The discussion is based on the physical laws of conserved quantities from applied mechanics and thermodynamics. The transformation of the different primary energies into final energy forms available on the market is subdivided into different chapters: fossil fuels, renewables, and nuclear energy. The principles behind all major conversion processes are explained and discussed, as well as future applications, new trends and opportunities. For most conversions, the energy efficiency (first order approximation, e.g. Carnot efficiency for the thermodynamic cycles) is computed and possible savings estimated, without hiding social and environmental aspects.

Final competences

- I. 4. Understanding of extensive academic subject matter in the field of Social and Military Sciences: EP
- II. 4. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: EP
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

VIII. 1. Thinking and acting ethically: Giving a sound vision including a reflection on the social and ethical responsibilities

Learning objectives

At the end of the course, the student is able to:

- Compare and explain the different energy conversion schemes (primary to final energy) for the most important converters based on fossil fuel, nuclear energy and renewables.
- Implement the Carnot model to estimate the footprint (primary energy) of a certain consumed quantity of final energy produced by a thermodynamic cycle.
- Check and criticize if a way of producing final energy is ethically correct.
- Organize the own consumption of final energy in order to increase the sustainability.

Required knowledge

SC611
SC621
SC623
SC624
EP901

Course material

Notes (printed)
Slides (digital)

References

Working methods

Ex Cathedra
Closed Tasks

EP915 : Applied Mechanics

Titular:

LCL (Land) Benoît Marinus (2 ECTS)

ECTS: 2

Contact hours: 11 hr(s) theory ; 10 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 6

Weight exam: 14

Type of exam: written

Content

1. Conservation laws of mass, momentum with a focus on thrust by reaction and energy
2. Dimensional analysis limited to force coefficients, Mach- and Reynolds-numbers
3. Heat exchange (convection, radiation, conduction)
4. Lift and drag forces on bodies
 - * Forces coefficients
 - * Dependency on shape, angle, Ma and Re
 - * Polar curves
5. Boundary layer
 - * Velocity profile
 - * Laminarity/turbulence
 - * Influence on force coefficients
 - * Boundary layer control
6. Effect of compressibility on the forces
 - * Flow tables in compressible flows
 - * Normal/oblique shock
 - * Expansion
 - * Wave drag
 - * Flow over a supersonic wing/fin
7. Fundamentals of flow in nozzles
 - * Isentropic cases
 - * Non-isentropic cases

Final competences

- I. 4. Understanding of extensive academic subject matter in the field of Social and Military Sciences: EP
- II. 4. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: EP

Learning objectives

At the end of the course, students are expected to elaborate

1. the conservation laws of mass, momentum with a focus on thrust by reaction and energy,
2. dimensional analysis limited to force coefficients, Mach- and Reynolds-numbers,
3. heat exchange (convection, radiation, conduction),
4. lift and drag forces on bodies (projectiles, vehicles, aircraft, ships, wings, fins),
5. the role of the boundary layer with respect to the forces,
6. the effect of compressibility on the forces,
7. the fundamentals of ow in nozzles.

At the end of the course, students are expected to

1. solve elementary problems related to conservation laws and heat exchange,
2. solve elementary problems concerning thrust by reaction,
3. solve elementary problems related to dimensional analysis,
4. solve elementary problems pertaining to lift and drag forces on bodies (projectiles, vehicles, aircraft, ships, wings, fins),
5. solve elementary problems pertaining to nozzles with focus on the generation of thrust.

At the end of the course, students are also expected to be able to

1. judge and formulate operational requirements pertaining to systems requiring or subject to lift, drag and/or thrust by nozzles,
2. judge recent developments and trends in the the above fields and acquire knowledge independently.

Required knowledge

SC611

SC621

SC623

EP901

Course material

Notes (printed)

Notes (digital)

Slides (digital)

References

Anderson J.D., Fundamentals of aerodynamics,3rd Ed, McGraw Hill, 2005

Videos (online on BelADL)

Working methods

Ex Cathedra

Closed Tasks

Blended Learning

LC906 : Leadership

Titular:

LCL MAB (Land) Hans De Smet (3 ECTS)

ECTS: 3

Contact hours: 22 hr(s) theory ; 2 hr(s) practice ; 6 hr(s) visit

Evaluation:

Daily work: amount written evaluations: 0

Daily work: amount oral evaluations: 1

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

The LS906 Leadership courses focuses on various very special and specific features of leadership such as (non exhaustive) :

- toxic leadership;
- lucifer effect;
- mission command;
- leadership among equals;
- cultural diversity;
- LMX (leader-members exchange) theory;

The methodology focuses on the self-Learning and teaching competencies of the students. It follows the LS815 Leadership course.

Final competences

I. 5. Understanding of extensive academic subject matter in the field of Social and Military Sciences: LC

II. 1. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: BS

III. 1. Applying language and communication skills efficiently:
Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these

III. 2. Applying language and communication skills efficiently:
Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach

IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

V. 2. Working with people as an individual or in a group: Handling the different aspects of leadership

Learning objectives

At the end of the course, the student possesses the competencies required to :

- explain and illustrate the characteristics of a special situation pertaining leadership;
- in a team, prepare and give a class (definition, characteristics, (dis-)advantages) on a special leadership situation (selected in a list) and organise a class discussion leading to the formulation of recommendations to improve the leadership in that specific type of situation;
- analyse a case based on the studied special situations pertaining leadership, and formulate recommendations to improve the leadership in that type of situation.

Required knowledge

LC815

Course material

Articles

References

Working methods

Demonstration
Teaching Conversation
Class Discussion
Open Tasks

RS971 : Master Thesis Supervisor

Titular:

COL IMM (Land) Geert Letens (9 ECTS)

ECTS: 9

Contact hours: hr(s) theory ; hr(s) practice ;

Evaluation:

Daily work: amount written evaluations:

Daily work: amount oral evaluations:

Weight daily work: 0

Weight exam: 90

Type of exam:

Content

Referece: P-RMA-126: The Master thesis (MAT) is a written work that is also defended orally and with which the student, under the supervision of a supervisor, demonstrates that he has reached the final objective levels of the curriculum. The student analyses responsibly a complex issue and provides it with an original solution and commentary, prepares a written report of this analysis in a clear, well-founded and convincing manner, presents it to a jury and defends it against critical questions. The subject of the MAT should be chosen within a departement of the SSMW- or POL-faculty. The student conducts an independent and creative research that is substantively relevant for the field and for Defense.

Final competences

- I. 1. Understanding of extensive academic subject matter in the field of Social and Military Sciences: BS
- II. 1. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: BS
- III. 1. Applying language and communication skills efficiently:
Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these
- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- V. 1. Working with people as an individual or in a group: Adapting to individual human behavior and group dynamics
- VI. 1. Acting autonomously: Shaping and regulating his/her own learning process in function of his/her results
- VII. 1. Collaborating in a multidisciplinary environment: Collaborating beyond the borders of specific disciplines to reach a common goal

Learning objectives

The MAT consists of a written and an oral part. With the MAT, the student demonstrates that he/she can: - elaborate a research project - collect independently information and assess its relevance for answering the research question - monitor independently and analyse developments in the research domain - communicate in a scientifically correct language - use modern and adapted methods and/or techniques - analyze critically the results obtained and their interpretation - report and defend the results in a coherent whole - summarize the previous relevant studies so that the reader is informed about the current situation in the relevant domain - respect the ethical rules when conducting the research. With the oral defense before the jury, the student shows that he/she can: - present the MAT in a fascinating and structured way - critically justify the research conducted, the results and the conclusions.

Required knowledge

CL618

RS872

RS620

RS619

Course material

References

TBD in agreement with supervisor

Working methods

Open Tasks

RS972 : Master Thesis 2nd supervisor

Titular:

COL IMM (Land) Geert Letens (6 ECTS)

ECTS: 6

Contact hours: hr(s) theory ; hr(s) practice ;

Evaluation:

Daily work: amount written evaluations:

Daily work: amount oral evaluations:

Weight daily work: 0

Weight exam: 60

Type of exam:

Content

Final competences

Learning objectives

Required knowledge

Course material

References

Working methods

RS973 : Master Thesis Jury

Titular:

COL SBH (Land) Kris Quanten (3 ECTS)

ECTS: 3

Contact hours: hr(s) theory ; hr(s) practice ;

Evaluation:

Daily work: amount written evaluations:

Daily work: amount oral evaluations:

Weight daily work: 0

Weight exam: 30

Type of exam:

Content

Final competences

Learning objectives

Required knowledge

Course material

References

Working methods

SC001 : Environment / Oceanography

Titular:

CPV SBH (Nav) Guy Schotte (3 ECTS)

ECTS: 3

Contact hours: 20 hr(s) theory ; 7 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 1

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

The course is an introduction to descriptive oceanography. It starts with an overview of the creation of the earth and the oceans. There is a short overview of the history and evolution of oceanography/oceanology. Different oceanographic phenomena, such as tectonic activity and the impact on the oceans topography are explained. The creation and impact of sediments are also explained. Starting from the elementary characteristics of H₂O, specific characteristics of sea water are derived; Elements such as salinity, water layers stratification, transmission of light in water, thermostatic effects, gas cycles and chemical equilibrium of the oceans are introduced (including acidification).

The use of sound as a means of detection in water are developed with a focus on the sonar equation and its different elements. A basic knowledge of the ray path theory is taught with a focus on anti-submarine warfare operations.

The atmospheric and oceanic circulation models are explained as well as their respective interaction. Phenomena such as waves are introduced as well as coastal classification.

Through a briefing by a SME from MRSys-N the relevance of oceanography in the daily work of a naval officer is demonstrated. A visit to the Mine Warfare unit in Zeebrugge illustrates in practice certain aspects of the course.

Through lecture of IPCC reports the aspect of climate change is introduced.

Final competences

I. 6. Understanding of extensive academic subject matter in the field of Social and Military Sciences: SC

- II. 6. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: SC
- III. 1. Applying language and communication skills efficiently: Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these
- III. 2. Applying language and communication skills efficiently: Communicating orally his/her conclusions, knowledge, and the rationale underpinning these
- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach
- VI. 2. Acting autonomously: Gathering and interpreting relevant information from the different disciplines to devise a sound judgment, solve a complex problem, and/or decide

Learning objectives

At the end of the course, the student

- can define oceanographic terms
- Can describe how oceans and the atmosphere have been formed
- Can predict and derive from sediment and tectonic theory how the ocean topography is formed
- can describe geothermal activity and bottom topography and link it to tectonic theory
- Can illustrate key characteristics from seawater/oceans by extrapolating basic characteristics of water
- Can link the oceanic, atmospheric and climate models and predict the influence from one to the other
- Can apply coastal classification
- Can describe the equilibrium theory of the ocean and associated gas cycles
- Can differentiate behaviour of sound and light in the oceans
- Can apply the sonar equation and ray path theory to a problem of anti submarine warfare
- can describe the working method of the IPCC and apply/defend the findings of the IPCC to discussions on climate change
- can illustrate the link between oceanography and naval units/functions
- Can analyse an oceanographic problem through research and link it to knowledge gathered through the course
- can create a written report and an oral presentation explaining the findings of his research on the oceanographic subject

Required knowledge

Course material

Book (loan)
Slides (digital)
Articles

References

Tom S. Garrison (University of Southern California), *Oceanography: an invitation to Maritime Science* (4th edition), Wadsworth/Thomson Learning, 2002 (Basisboek voor cursus)
Extra documentatie (optioneel)
William G. Van Dorn, *Oceanography and Seamanship*, Schiffer Publishing, 1993.
Henry Stommel, *A View of the Sea*, Princeton University Press, 1991.
K. Sverdrup, A. Duxbury, and A. Duxbury, *An Introduction to the World's Oceans*, 8th Ed., McGraw Hill, 2005.
Douglas Segar, *Introduction to Ocean Sciences*, (), 2nd Ed. (2007), W.W. Norton & Co
Website IPCC

Working methods

Ex Cathedra
Teaching Conversation
Class Discussion
Open Tasks
Demonstration

SM914 : Mechanics of Materials and Structures

Titular:

LCL (Land) David Lecompte (3 ECTS)

ECTS: 3

Contact hours: 14 hr(s) theory ; 16 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

Material families and bonding forces

Determination of mechanical properties

Mechanical structures

External and internal forces on a solid structure

Static stress and strain determination

Simple and combined loading cases

Final competences

I. 8. Understanding of extensive academic subject matter in the field of Social and Military Sciences: WS

II. 8. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: WS

Learning objectives

To be able to explain the behavior of materials starting from their bonding forces

Understand the importance of material performance

To be capable of making elementary stress and strain calculations for simple loading cases

Required knowledge

SC623

Course material

Notes (printed)

Slides (digital)

Slides (printed)

References

Working methods

Ex Cathedra

Teaching Conversation

Closed Tasks

SM921 : Land Vehicles Propulsion, Stability and Performance

Titular:

LCL (Land) Kristof Harri (4 ECTS)

ECTS: 4

Contact hours: 24 hr(s) theory ; 16 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 13

Weight exam: 27

Type of exam: written

Content

1. Vehicle design and mobility
 - Classification of vehicles
 - Coordinate system
 - Vehicle design
 - Safety
 - Regulations
2. Prime movers for motor vehicles
 - Internal combustion engines
 - Electric vehicles
 - Fuel Cells
 - Hybrid Vehicles
3. Propulsion
 - Tire mechanics
 - Non driven wheel
 - Driven wheel
 - Propulsion equation of a vehicle
4. The clutch
 - Dynamics
 - Technology
5. The gearbox
 - Choice of a gear ratio
 - Technology of the gearbox
6. Propeller shaft and differential
 - FWD
 - RWD
 - Differential
7. Steering
8. Braking

- Dynamics of braking
 - Technology of the braking system
 - ABS
9. Suspension
- Guiding elements
 - Force elements

Final competences

- I. 8. Understanding of extensive academic subject matter in the field of Social and Military Sciences: MT
- II. 8. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: MT
- IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach
- IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

Learning objectives

- After this course the student is expected to
- identify, describe and explain the working principle of different (basic) components of a vehicle;
 - clarify the essential vocabulary of land vehicles;
 - have a basic knowledge of vehicle technology;
 - solve 'simple' applications with respect to land vehicles;
 - translate the technical specifications of a land vehicle;
 - calculate the basic performance of a land vehicle starting from the specifications.

Required knowledge

SC611
 SC621
 SC623
 EP901

Course material

Notes (digital)
 Notes (printed)
 Slides (digital)

References

Working methods

Class Discussion
Demonstration
Closed Tasks

SM931 : Aircraft Propulsion, Stability and Performance

Titular:

LCL (Land) Benoît Marinus (4 ECTS)

ECTS: 4

Contact hours: 24 hr(s) theory ; 18 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 13

Weight exam: 27

Type of exam: Oral

Content

This course discusses flight mechanics: the kinematics and dynamics of and around the centre of gravity of an aircraft, which is considered to be rigid. The course consists of:

1. Performance (SM931a)

- performance in straight and level flight
- load factor, manoeuvres in the vertical plane and gusts
- manoeuvres in the horizontal plane
- energy management
- take-off and landing analysis

2. Stability (SM931a)

- the aerodynamic centre
- conditions for longitudinal stability and equilibrium
- conditions for lateral and directional stability
- interaction between slip, roll, and yaw; stability derivatives
- control derivatives of roll and yaw control
- notions of dynamic stability
- coupling with aeroelasticity

3. Propulsion (SM931b)

4. Practical exercises

In the practical exercise sessions students solve problems under supervision. The selected problems are a direct application of knowledge and concepts gained in the lectures.

5, Project: the student makes a comprehensive performance study through its own calculation sheet of an aircraft and of its propulsion. The project is defended orally.

Final competences

I. 10. Understanding of extensive academic subject matter in the field of Social and Military Sciences: MT

II. 10. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: MT

III. 2. Applying language and communication skills efficiently: Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach

IV. 2. Thinking critically and acting scientifically: Elaborating a research question with a critical and evidence-based approach

IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

VI. 2. Acting autonomously: Gathering and interpreting relevant information from the different disciplines to devise a sound judgment, solve a complex problem, and/or decide

Learning objectives

At the end of the course, students are expected to

1. elaborate the fundamentals of aircraft propulsion,
2. elaborate aircraft performance and the equations of motion,
3. elaborate the fundamentals of aircraft static stability,
4. judge and develop operational requirements pertaining to aircraft,
5. critique recent developments and trends in the field and acquire knowledge independently.

At the end of the course, students are expected to

1. solve elementary problems related to aircraft propulsion,
2. solve problems concerning aircraft performance,
3. solve elementary problems related to aircraft longitudinal static stability.

Required knowledge

SC611

SC612

SC621

SC623

EP901

EP915

Course material

Notes (printed)

Notes (digital)

Slides (digital)

References

Introduction To Flight (Third Edition) by John D. Anderson, Jr

Working methods

Ex Cathedra

Closed Tasks

Open Tasks

Blended Learning

SM941 : Ship Propulsion, Stability and Performance

Titular:

LCL (Land) Bart Janssens (4 ECTS)

ECTS: 4

Contact hours: 16 hr(s) theory ; 20 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 13

Weight exam: 27

Type of exam: Oral

Content

1. Static Stability
 - Stability of the floating body
 - Stability of the intact ship
 - Stability computations
 - Stability curves
 - Moving, loading and unloading weights
 - The problem of mobile cargo
 - Hull damage
 - Grounding
2. Dynamic stability
 - The influence of waves
 - Damping installations
3. Ship resistance
 - The towing tank experiment
 - Determination of the propulsive power
4. The propulsion system

Final competences

I. 4. Understanding of extensive academic subject matter in the field of Social and Military Sciences: EP

I. 4. Understanding of extensive academic subject matter in the field of Social and Military Sciences: EP

Learning objectives

At the end of the course, students are expected to be able to

1. Explain the basic principles of ship stability and the factors influencing performance

2. Make operational decisions while being aware of the potential impact on stability and performance
3. Conduct elementary research and acquire knowledge independently concerning recent developments and trends

Required knowledge

SC621
SC623
EP915
EP901

Course material

Notes (digital)
Slides (digital)

References**Working methods**

Ex Cathedra
Demonstration
Closed Tasks

TN911 : Telecommunications and C4I

Titular:

MAJ (Air) Thibault Debatty (3 ECTS)

ECTS: 3

Contact hours: 16 hr(s) theory ; 8 hr(s) practice ; 8 hr(s) visit

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: written

Content

This course is the follow-up of TN722. It will focus on more advanced networking concepts:

- * link aggregation
- * STP
- * Routing protocols : OSPF
- * IPv6
- * VoIP
- * SDN

Final competences

I. 8. Understanding of extensive academic subject matter in the field of Social and Military Sciences: MT

II. 8. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: MT

IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

Learning objectives

- * explain and apply advanced networking techniques and solutions
- * analyze new networking solutions and compare them with known technologies
- * compare the technologies with the "basic" working of a network, as seen during the course TN722

Required knowledge

Course material

Slides (digital)

Notes (digital)

References

Working methods

Ex Cathedra

Closed Tasks

Open Tasks

Teaching Conversation

Demonstration

TP912 : Management of Cybersecurity

Titular:

GHL (Civ) Wim Mees (3 ECTS)

ECTS: 3

Contact hours: 15 hr(s) theory ; 15 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

The course covers different aspects of how cybersecurity is managed in a modern organization.

This involves:

- knowing what needs to be protected
- understanding how these assets are threatened
- choosing what needs to be done
- knowing the major building blocks for implementing a solution
- having a notion of cybersecurity governance standards, frameworks, and best practices

Final competences

IV. 1. Thinking critically and acting scientifically: Gathering information with a critical and evidence-based approach

IV. 3. Thinking critically and acting scientifically: Formulating a judgment on the grounds of critical thinking and an evidence-based approach

Learning objectives

The students will be able to contribute to designing, implementing, operating and maintaining cybersecurity solutions in an organization.

Required knowledge

TN722

Course material

Slides (digital)

References

Working methods
Ex Cathedra

WS913 : Fire Control and Guided Weapons

Titular:

LCL (Land) Alexandre Papy (3 ECTS)

ECTS: 3

Contact hours: 27 hr(s) theory ; 0 hr(s) practice ;

Evaluation:

Daily work: amount written evaluations: 1

Daily work: amount oral evaluations: 0

Weight daily work: 10

Weight exam: 20

Type of exam: Oral

Content

In the first part of the course (14 Hr), the four main fonctions of guided weapons are described; guidance, control, propulsion and warhead. For each fonction, a classification and an explanation of the working principles are given. A 2DOF trajectory model is developed and examples of launch and intercept envelopes are given.

In the second part (13 Hr) trajectory modeling is applied in order to create practical Fire Control Systems. After defining general principles, different aspects such as aiming techniques and weaponeering are analyzed for direct and indirect fire applications. Specific weapon systems include small arms, land, air and naval systems.

Final competences

I. 8. Understanding of extensive academic subject matter in the field of Social and Military Sciences: MT

II. 8. Applying relevant and valid information to devise arguments, solve complex problems, formulate recommendations, and/or make decisions in the field of Social and Military Sciences: MT

III. 1. Applying language and communication skills efficiently:
Communicating in writing his/her conclusions, knowledge, and the rationale underpinning these

III. 2. Applying language and communication skills efficiently:
Communicating orally his/her conclusions, knowledge, and the rationale underpinning these

VI. 2. Acting autonomously: Gathering and interpreting relevant information from the different disciplines to devise a sound judgment, solve a complex problem, and/or decide

Learning objectives

By the end of the course, students will be able to:

- Give a reasoned vision of the basic working principles of guided weapons,
- compare the guidance, control and propulsion methods,
- make the distinction between the aiming and laying of unguided weapons for different operational settings

Required knowledge

WA721

SE821

WS822

Course material

Slides (digital)

Notes (printed)

References

Working methods

Ex Cathedra

Teaching Conversation