

Modulhandbuch

Air Traffic Management – dual (B.Sc.)

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1 Allgemeiner Teil

Ein Hinweis vorab:

Aus Gründen der besseren Lesbarkeit wird auf die gleichzeitige Verwendung männlicher und weiblicher Sprachformen verzichtet. Sämtliche Personenbezeichnungen gelten gleichermaßen für alle Geschlechter.

1.1 Einleitung

Das Modulhandbuch bezieht sich auf den ausbildungsintegrierten Studiengang »Air Traffic Management – dual« am Fachbereich Touristik/Verkehrswesen. Der Studiengang umfasst sechs Semester, innerhalb dieses Zeitraums werden insgesamt 180 ECTS-Punkte erreicht. Bei erfolgreichem Abschluss wird der Abschlussgrad Bachelor of Science verliehen.

Die Studiengangsidee des Studiengangs »Air Traffic Management – dual« integriert sich gut in die Gesamtperspektive des Fachbereiches Touristik/Verkehrswesen: Der Studiengang ergänzt das bestehende Angebot an Luftverkehrsstudiengängen. Gemeinsam mit den Studiengängen »Aviation Management«, »Aviation Management – dual« und »Aviation Management and Piloting – dual« deckt er einen großen Bereich der unterschiedlichen Berufsbilder in der Luftverkehrsbranche ab: Der Studiengang »Aviation Management« bildet Fachkräfte für den kommerziellen Bereich der Luftverkehrsbranche und das dazugehörige Management aus. Der Studiengang »Aviation Management and Piloting – dual« verbreitert die Pilotenausbildung um betriebswirtschaftliche Inhalte. Der Studiengang »Air Traffic Management – dual« hingegen verbreitert die Fluglotsenausbildung um betriebswirtschaftliche Inhalte und branchenspezifische Kenntnisse aus dem Bereich Aviation Management.

Durch die Kombination von Fluglotsenausbildung und betriebswirtschaftlichem Studium erwerben die Absolventen ein breites Spektrum an Kompetenzen, das ihnen berufliche Perspektiven auch außerhalb des klassischen Betätigungsfeldes als Fluglotse in der Tower- oder Center-niederlassung eröffnet.

1.2 Allgemeine Studienziele/ Qualifikationsziele

Studierende des Studiengangs »Air Traffic Management – dual« erhalten während des Studiums einen Überblick über das Gesamtsystem Luftverkehr. Gleichzeitig bauen sie ein eigenes Netzwerk mit Studierenden aus anderen Teilbereichen des Gesamtsystems Luftverkehr auf, da die Lehrveranstaltungen am Fachbereich Touristik/Verkehrswesen der Hochschule Worms teilweise von Studierenden aus unterschiedlichen Studiengängen belegt werden. Sie entwickeln somit ein interdisziplinäres Verständnis für das Netzwerk Luftverkehr und blicken über den Tellerrand der Flugsicherung weit hinaus.

Im Studiengang »Air Traffic Management – dual« wird durch die Vermittlung aktueller und praxisorientierter Inhalte auf akademischem Niveau in Kombination mit der Fluglotsenausbildung die Beschäftigungsfähigkeit der Absolventen gewährleistet.

Innerhalb der Deutsche Flugsicherung GmbH (DFS) können die Absolventen des Studiengangs »Air Traffic Management – dual« zum einen als Fluglotsen eingesetzt werden. Zum anderen gibt es darüber hinaus Bedarf an Projektmanagern für interdisziplinäre Projekte an den verschiedenen DFS-Standorten, bei DFS-Tochterunternehmen oder im Rahmen von Kooperationen mit anderen Luftverkehrsteilnehmern (z.B. Flughafenbetreibern und Fluggesellschaften). Die Absolventen kommen auch für alle anderen konzeptionellen und betrieblichen Sonderaufgaben in Betracht, die sich im europäischen und flugsicherungsübergreifenden Kontext bewegen. Das Studium soll für weitere Tätigkeitsbereiche insbesondere im Luftverkehr (z.B. bei Flughäfen und Fluggesellschaften) qualifizieren, z.B. bei dem Wunsch einer

beruflichen Neuorientierung oder für den Fall, dass die Tätigkeit als Fluglotse aus z.B. gesundheitlichen Gründen nicht fortgeführt werden kann. Neben einer Neuorientierung innerhalb der DFS kommen Arbeitgeber wie Verkehrsflughäfen, Forschungsinstitutionen wie das Deutsche Zentrum für Luft- und Raumfahrt (DLR), Aufsichtsämter wie das Bundesaufsichtsamt für Flugsicherung (BAF) oder ggf. auch Luftverkehrsgesellschaften in Frage.

Der Studiengang »Air Traffic Management – dual« vermittelt den Studierenden die hierfür erforderlichen Kenntnisse betriebswirtschaftlicher und luftverkehrsbezogener Methoden und Konzepte sowie die für das Management relevanten Schlüsselqualifikationen. Die Lehrinhalte und Veranstaltungsformen des Studiengangs dienen dem Ziel, den Studierenden ein breites und integriertes Wissen und Verstehen der wissenschaftlichen Grundlagen des Lerngebietes auf dem aktuellen Stand der Forschung zu vermitteln. Die Studierenden werden befähigt, praxisbezogene Problemstellungen zu erkennen und zu lösen. Darüber hinaus sollen die Absolventen in die Lage versetzt werden, sich auch nach dem Studienabschluss selbständig neues Wissen und Fähigkeiten anzueignen (Methodenwissen). Die Studierenden erlernen außerdem im Rahmen der Fluglotsenausbildung alle Fähigkeiten und Qualifikationen, die sie für eine Tätigkeit als Fluglotse benötigen. Hier ergibt sich die Chance, die berufliche Tätigkeit als Fluglotse auch im Rahmen einer akademischen Ausbildung zu erschließen und so eine neue, zusätzliche Alternative in diesem Sektor beruflicher Ausbildung anbieten zu können.

Das Studiengangskonzept orientiert sich an den zuvor beschriebenen Qualifikationszielen. Diese umfassen fachliche und überfachliche Aspekte und beziehen sich insbesondere auf die Befähigung, eine qualifizierte Erwerbstätigkeit aufzunehmen, dienen aber auch der Persönlichkeitsentwicklung und der Befähigung zu gesellschaftlichem Engagement.

Die fachlichen Qualifikationsziele umfassen neben dem Erwerb von Fachwissen auch den Erwerb von Sprachkompetenz in englischer Sprache. Die Absolventen des Bachelorstudienganges »Air Traffic Management – dual« kennen wissenschaftliche Grundlagen und verfügen über praktische Fähigkeiten in einzelnen Bereichen des Luftverkehrsmanagements. Auf der Grundlage des erworbenen Wissens ordnen sie Sachverhalte und Themengebiete fachgerecht ein und können diese unter Anwendung geeigneter Methoden analysieren. Die Absolventen beherrschen die englische Sprache auf dem Niveau C1 gemäß dem Europäischen Referenzrahmen.

Im Hinblick auf die überfachlichen Qualifikationsziele erwerben die Studierenden die Fähigkeit zu selbständigem und kritischem Denken. Sie lernen eigene und fremde Ideen und Argumentationen konstruktiv zu hinterfragen und sind in der Lage, Sachverhalte zu verknüpfen.

Die Studierenden lernen, sich in vorher unbekannte Themenbereiche einzuarbeiten und sich Informationen zu einem begrenzten Themengebiet selbständig durch Recherche anzueignen, diese strukturiert aufzubereiten und in geeigneter Form sowohl schriftlich als auch mündlich zu präsentieren. Die Absolventen sind in der Lage, für die Präsentation adäquate Medien auszuwählen und einzusetzen. Die Studierenden erwerben die Fähigkeit, eigene Arbeitsprozesse selbständig und termingerecht zu organisieren, sie sinnvoll zu strukturieren und zielgerichtet auszuführen. Die Diversität, die sich durch die Zusammensetzung der Studierenden in den englischsprachigen Lehrveranstaltungen ergibt, befähigt die Studierenden, sich in fremde Kulturen hineinzuversetzen und im interkulturellen Kontext der globalen Luftverkehrsbranche zu kommunizieren und flexibel zu handeln.

Die Diversität der Studierenden trägt auch zu deren Offenheit für gesellschaftliches Engagement bei. Durch die Englischsprachigkeit sind die Lehrveranstaltungen grundsätzlich stärker als deutschsprachige Lehrveranstaltungen für Studierende aus dem europäischen und außereuropäischen Ausland attraktiv. Die Lehrveranstaltungen werden zudem auch von den Studierenden anderer Studiengänge, z. B. »Aviation Management«, »Tourism and Travel Management«, »Aviation Management and Piloting –dual«, besucht. Das führt zu einer

Durchmischung der Studierenden im Hinblick auf Nationalitäten, Religion, Alter oder sozioökonomischen Status, und damit zu vielfältigen Erfahrungen, Perspektiven und Handlungsmöglichkeiten zu Fragen der Nachhaltigkeit, der Umwelt und des ethischen Wirtschaftens. Diese Diversität erzeugt ein Lernumfeld, das unmittelbar zum Kompetenzerwerb interkultureller Fertigkeiten wie etwa interkulturelle Kommunikation, Verhandlung, Konfliktlösung beiträgt, aber auch zu einem Gefühl für soziale Verantwortung, ethische Sensibilität und Toleranz.

Das Studiengangskonzept ist auf die Befähigung der Studierenden zum gesellschaftlichen Engagement innerhalb der Hochschule, in der Region um die Stadt Worms sowie auf nationaler und internationaler Ebene ausgerichtet. Die Studierenden werden motiviert, schon während des Studiums in sozialen und politischen Zusammenhängen tätig zu werden, beispielsweise innerhalb der Hochschule in der Mitwirkung in den demokratischen Institutionen und Gremien der studentischen und /oder akademischen Selbstverwaltung. Die tatsächliche Mitbestimmung soll den Studierenden die Bedeutung von zivilgesellschaftlichem Engagement in ihrer direkten Umgebung verdeutlichen und sie motivieren, ihre Meinung aktiv und konstruktiv einzubringen und sich auch nach dem Studium zu engagieren. Die Lehrenden des Studiengangs sind aufgefordert, Handlungsfelder, Möglichkeiten und die Bedeutung zivilgesellschaftlichen Engagements im Rahmen des Curriculums zu thematisieren.

Die Studierenden werden dazu ermutigt, den Einsatz ihrer im Studium erlangten professionellen Handlungs- und Urteilsfähigkeit in Bezug auf interdisziplinäre Fragestellungen und Interkulturalität nicht auf das berufliche Handlungsfeld zu begrenzen, sondern auch darüber hinaus zivilgesellschaftlich einzusetzen.

Nachstehend werden drei Module aus dem Curriculum genannt, bei denen die Studierenden Kompetenzen erwerben, welche im Sinne des zivilgesellschaftlichen Engagements interpretiert werden können:

- ATM 23 Air Transportation Policy and Law: Hier werden u.a. Regulierungsmaßnahmen im Luftverkehr vor dem Hintergrund gesellschaftlich geteilter Werte und Normen erörtert und dabei auch Bezüge zu historischen und aktuellen Ereignissen und Entwicklungen hergestellt. Auch wird ein Kompetenzerwerb für kritische Argumentationstechniken zu gesellschaftlich relevanten Fragestellungen im Hinblick auf die eigene Gesellschaft als auch in Bezug auf die europäische Gemeinschaft gefördert.
- ATM 34 Aviation and Environment: Hier werden professionelle Fähigkeiten, methodische Kompetenzen sowie die Befähigung der Studierenden zum gesellschaftlichen Engagement bei Nachhaltigkeits- und Umweltthemen gefördert. Der Syllabus beinhaltet u.a. die Umweltauswirkungen des Luftverkehrs („Greenhouse gases“ (GHGs), Schadstoffe, Lärm), politische Instrumente für den Umweltschutz, Normen, Anreize, Emissions Trading System (ETS), Flächennutzungsplanung sowie aktives Umweltmanagement bei Fluggesellschaften und Flughäfen.
- ATM 32 Human Resources Management and Organizational Development: Hier geht es u.a. um Kompetenzerwerb zu gesellschaftlich geteilten Werten und Normen. Wichtiger Modulinhalt ist ethisches Verhalten im persönlichen, beruflichen und öffentlichen Leben im Hinblick auf eine Reflexion von politischen, sozialen, kulturellen Ereignissen sowie die Fertigkeit, ethische Konsequenzen abzusehen. Zum Syllabus-Plan des Moduls gehören unter der Überschrift „Organizational ethics and social responsibility“ auch der Erwerb von Kenntnissen und Fertigkeiten in verschiedenen Kommunikations-, Kooperations- und Konfliktsituationen sowie die Bereitschaft, sich auf diese Situationen einzulassen

1.3 Zulassungsvoraussetzungen

§ 4 Zugangsvoraussetzungen, Studienbeginn (zu § 6 RPO)

(1) Über die in § 6 RPO geregelten Zugangsvoraussetzungen hinaus gelten folgende weitere Zugangsvoraussetzungen:

1. Studienbewerberinnen und Studienbewerber für den Bachelorstudiengang müssen einen entsprechenden Studien- und Ausbildungsvertrag mit der DFS Deutsche Flugsicherung GmbH abgeschlossen haben.

1.4 Modularisierte Studiengänge - Modulprüfungen

Der Bachelorstudiengang »Air Traffic Management« ist in Modulen organisiert. Unter Modulen versteht man in sich abgeschlossene Lehr- und Lerneinheiten, die aus mehreren inhaltlich aufeinander bezogenen Lehrveranstaltungen (z. B. aus Seminaren, Vorlesungen, Übungen) bestehen.

In jedem Modul werden bestimmte fachspezifische und / oder berufsbezogene Qualifikationen vermittelt. Am Ende eines jeden Moduls steht eine Modulprüfung, in der festgestellt wird, ob die vorgesehenen Studien- und Qualifikationsziele erreicht wurden. Die Ergebnisse der Modulprüfungen werden bewertet und fließen in die Abschlussnote (siehe Prüfungsordnung) ein.

Die Modulbeschreibungen im fachspezifischen Teil informieren über die Qualifikationsziele und Inhalte der einzelnen Module, über die zugehörigen Lehrveranstaltungen und über die jeweilige Modulprüfung.

1.5 Erwerb von Leistungspunkten (im ECTS)

In allen Bachelorstudiengängen werden mit Bezug auf das effektive Arbeitspensum (Workload) der Studierenden Leistungspunkte (Credit Points) nach dem European Credit and Transfer and Accumulation System (ECTS) vergeben. Die Leistungspunkte (Credit Points) drücken aus, wie viel Zeit Studierende im Durchschnitt aufwenden müssen, um die vorgeschriebenen Qualifikationsziele des jeweiligen Studienabschnittes zu erreichen. Dabei zählt nicht nur die Zeitspanne, die Studierende in Lehrveranstaltungen verbringen (Präsenzstudium), sondern auch der Arbeitsaufwand, der für die Vorbereitung und für die Nachbereitung einer Lehrveranstaltung sowie für die Vorbereitung auf Prüfungen notwendig ist.

Bei der Bestimmung der Leistungspunkte gilt folgende Regel: 30 Stunden studentische Arbeitszeit ergeben einen Leistungspunkt. Der Arbeitsaufwand für ein Studienjahr wird in ganz Europa mit insgesamt 60 Leistungspunkten veranschlagt. Das entspricht einem Workload von etwa 37,5 Stunden pro Arbeitswoche.

Im sechssemestrigen Studiengang »Air Traffic Management« müssen insgesamt 180 Leistungspunkte erworben werden.

Nähere Bestimmungen zur ECTS-Vergabe der einzelnen Module finden sich im fachspezifischen Teil des Modulhandbuches.

2 Fachspezifischer Teil

2.1 Study Plan

Modulbezeichnung	Nr.	Art	Lehrveranstaltungen	Sem	Prüfung	Prüfungsform (Dauer)	Gesamt		Regelsemester LP (SWS)					
							LP	SWS	1.	2.	3.	4.	5.	6.
Basismodule 98 LP														
Introduction to Business Administration	ATM 10	P	V (4 SWS)	1	PL	K (120 min)	5	4	5 (4)					
Introduction to Economics	ATM 11	P	V (4 SWS)	1	PL	K (120 min)	5	4	5 (4)					
Introduction to Air Traffic Management	ATM 12	P	V (4 SWS)	1	PL	K (120 min)	5	4	5 (4)					
Introduction to Aviation Management	ATM 13	P	V (4 SWS)	1	PL	K (120 min)	5	4	5 (4)					
Business English	ATM 14	P	V (4 SWS)	1	MTP	K (120 min) + Präs. (15-30 min)	5	4	5 (4)					
Analytical Methods	ATM 15	P		1	PL	K (120 min)	5	4						
Mathematics	ATM 151		V (2 SWS)						3 (2)					
Statistics	ATM 152		V (2 SWS)						2 (2)					
Research Methods, Presentation and Soft Skills	ATM 20	P		2	MTP		4	4						
Research Methods and Presentation Skills	ATM 201		V (2 SWS)			HA (9-11 Seiten)				2 (2)				
Soft Skills	ATM 202		V (2 SWS)			Präs. (20-30 min)				2 (2)				
Accountancy and Financial Reporting	ATM 21	P	V (4 SWS)	2	PL	K (120 min)	5	4		5 (4)				
Marketing and Sales Management	ATM 22	P	V (4 SWS)	2	PL	K (120 min)	5	4		5 (4)				
Air Transportation Policy and Law	ATM 23	P	V (4 SWS)	2	PL	K (120 min)	5	4		5 (4)				
Network Management and Scheduling	ATM 24	P	V (3 SWS)	2	PL	K (90 min)	5	3		5 (3)				
Aviation Analytics	ATM 25	P	V (4 SWS)	2	PL	K (120 min)	6	4		6 (4)				
Aircraft Operation	ATM 30	P	V (3 SWS)	3	PL	K (90 min)	4	3			4 (3)			
Elective Seminar Tourism and Travel Management (WP 1 aus 7) ²	ATM 31	WP	S (4 SWS)	3	MTP	HA (15 Seiten) + Präs. (20-30 min)	5	4			5 (4)			
Reiseveranstalter-/Reisemittlermanagement ²	ATM 311													
Verkehrsträgermanagement ²	ATM 312													
Destinationsmanagement ²	ATM 313													
Hotelmanagements ²	ATM 314													
Business Travel Management ²	ATM 315													
Eventmanagement ²	ATM 316													
Tourism and Travel Management ²	ATM 317													
Human Resources Management and Organizational Development	ATM 32	P	V (3 SWS)	3	PL	K (90 min)	5	3			5 (3)			
Airport Management	ATM 33	P	V (3 SWS)	3	PL	K (90 min)	5	3			5 (3)			

Modulbezeichnung	Nr.	Art	Lehrveranstaltungen	Sem	Prüfung	Prüfungsform (Dauer)	Gesamt		Regelsemester LP (SWS)					
							LP	SWS	1.	2.	3.	4.	5.	6.
Aviation and Environment	ATM 34	P	V (3 SWS)	3	PL	K (90 min)	5	3			5 (3)			
Airline Business Models and Strategies	ATM 35	P	V (4 SWS)	3	PL	K (120 min)	5	4			5 (4)			
Elective Seminar Aviation Management ²	ATM 54	P	S (4 SWS)	5	MTP	HA (25 Seiten) + Präs. (25 min) + PR	8	4					8 (4)	
Bachelorarbeit 10 LP														
Thesis	ATM 61	P		6	PL		10							10
Fluglotsenausbildung – Initial Training (IT) 52 LP¹														
Aeronautical English Oral ¹	ATM 40	P	V	4	PL	mP (20 min)	2	n/a				2		
Legal Bases and Aeronautical Basics ¹	ATM 41	P	V	4	PL	EK (180 min)	7	n/a				7		
Tower Operations and Aeronautical Basics ¹	ATM 42	P	V	4	PL	EK (180 min)	7	n/a				7		
Tower Procedures ¹	ATM 43	P	Ü	4	PL	PT (45-60 min)	4	n/a				4		
Air Traffic Control Procedures and Implications ¹	ATM 44	P	V	4	PL	EK (180 min)	7	n/a				7		
Surveillance Procedures ¹	ATM 45	P	Ü	4	PL	PT (45-60 min)	4	n/a				4		
Airspace and Basic Operational Procedures ¹	ATM 50	P	V	5	PL	EK (180 min)	4	n/a					4	
Operational Procedures ¹	ATM 51	P	V	5	PL	EK (180 min)	6	n/a					6	
Advanced Operational Procedures ¹	ATM 52	P	Ü	5	PL	PT (60 min)	6	n/a					6	
Consolidation of Operational Procedures and MO-ATS (Manual of Operations Air Traffic Services) ¹	ATM 53	P	Ü	5	PL	PT (60 min)	6	n/a					6	
Fluglotsenausbildung – Unit Training (UT) 20 LP¹														
On the Job Training (OJT) ¹	ATM 60	P		6			20	n/a						
Pre-OJT	ATM 601		Pr		SL									5
OJT	ATM 602		Pr		SL									15
Gesamtsumme							180	71	30 (24)	30 (23)	29 (20)	31 (0)	30 (4)	30 (0)

Legende:

P = Pflichtmodul, WP = Wahlpflichtmodul

Sem = vorgesehenes Semester

SWS = Semesterwochenstunde,

LP = Leistungspunkte

Lehrveranstaltungen: Pr = Praktikum, Ü = Übung, S = Seminar, V = Vorlesung

Prüfungen: PL=Prüfungsleistung, SL=Studienleistung, MTP = Modulteilprüfung, AB = Abschlussbericht, HA = Hausarbeit, K = Klausur, mP =

mündliche Prüfung, PA=Projektarbeit, PB = Praktikumsbericht; Präsen = Präsentation, Ref = Referat, PR = Peer-Review, EK = E-Klausur, PT = Practical Test (Simulator)

Nach § 14 Abs. 7 der RPO legt der Studiengang Air Traffic Management die weitere Prüfungsform "Peer-Review" fest. Die oder der Studierende fertigt ein 1-2 seitiges Gutachten an und trägt die wesentlichen Punkte unter kritischer Fragestellung in 5-10 Minuten mündlich vor. Im Übrigen gelten die Bestimmungen aus § 14 RPO.

Nach § 14 Abs. 7 der RPO legt der Studiengang Air Traffic Management die weitere Prüfungsform "Practical Test (Simulator)" fest. Die oder der Studierende wird im Rahmen einer praktischen Demonstration am Simulator hinsichtlich ihrer/seiner im jeweiligen Modul erworbenen Kompetenzen geprüft. Der Simulator ist dem Arbeitsplatz eines Fluglotsen nachempfunden und simuliert den zu koordinierenden Luftverkehr.

¹ Kennzeichnung von Modulen beim Praxispartner

² Eine Anwesenheit gemäß § 11 Abs. 3 RPO ist bei 80 % der Lehrveranstaltungen des Moduls erforderlich.

2.2 Module Descriptions

Introduction to Business Administration			
Module-No./ Code	ATM 10		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Introduction to Business Administration		
Trained competencies	Professional Skills Methodological Competence Social Skills Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to - recognize and articulate fundamental assumptions, ideas and concepts of business administration with regard to following topics: - Business organization and management - HR - Marketing - Accounting, - draw from theories and principles to help solve managerial problems.		
Syllabus plan	Fundamentals of management and organizations within contemporary society. Introduction to functional areas, management processes, themes and issues within management: - Business Organization and Management - Nature of business activity - Objectives, stakeholders and the external environment - Organizational planning - Growth and evolution - Globalization - Human Resources - Marketing - Accounting		
Semester of studies	1 st semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.)		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Karsten Benz		
Module lecturer(s)	Prof. Dr. Karsten Benz		

Instruction language	English
Examination type / requirements for assigning credit points	E-examination (value: 100%)
Duration of examination	120 min
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading, script and case studies
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Stimpson, P. / Smith, A. (2012) Business and Management • Wild, J. / Wild K. International Business, 2024 Literature recommendations are adapted and customised by the lecturer.

Introduction to Economics			
Module-No./ Code	ATM 11		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Introduction to Economics		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • describe fundamental assumptions, ideas and concepts of economics, • use economic theories and principles for solving managerial problems, • identify the effect of different market structures on firm's decision making, • explain the determinants of macroeconomic developments, • demonstrate their economic knowledge with respect to decisions concerning the tourism and transport industry.		
Syllabus plan	• Introduction ○ Basic questions and concepts ○ Economic modelling ○ Economic systems and market economy • Microeconomics ○ Households ○ Firms ○ Markets • Macroeconomics ○ National Accounting ○ Macroeconomic models		
Semester of studies	1 st semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management and Piloting – dual (B.Sc.) Aviation Management (B.A.) Tourism and Travel Management (B.A.): 21 Allgemeine Volkswirtschaftslehre		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Frank Fichert		
Module lecturer(s)	Prof. Dr. Frank Fichert		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written examination (value: 100%)		
Duration of examination	120 min		
Examination graded / not graded	graded		

Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading, script
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Principles of Economics, N. Gregory Mankiw, most recent edition • Macroeconomics, N. Gregory Mankiw, most recent edition • Intermediate Microeconomics. A Modern Approach, Hal R. Varian, most recent edition

Introduction to Air Traffic Management	
Module-No./ Code	ATM 12
Course of studies	Air Traffic Management – dual (B.Sc.)
Courses of the module	Introduction to Air Traffic Management
Trained competencies	Professional Skills Methodological Competence
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • describe different areas in ATM; • identify different factors affecting ATM, • state basic knowledge of execution of flights in airspace, airspace separations and classes, tasks of air traffic services, security methods, • describe connection between aircraft and air traffic management service in present aviation.
Syllabus plan	Introduction to the module History of Air Traffic Management (ATM) International bodies and organisations: ICAO Eurocontrol, EASA, EU, complexity of Europe Legal structure of ANSPs National ANSP organisation: DFS group The importance of safety management in ATC Contribution of quality management to safety Introduction to Air Traffic Management ATM concepts and terminology Airspace structures Aerodromes and Control Centers Separation Air Traffic Flow and Capacity Management / Network Management Aeronautical Information Service Technical equipment in ATC Introduction to communications Ground-ground and air-ground communications Data communications Introduction to navigation Ground-based navigation systems Space-based navigation systems Introduction to surveillance Primary and secondary surveillance radar Multilateration Automatic dependent surveillance ASMGS systems Introduction to data processing Surveillance data processing and flight data processing Support systems and automation systems System monitoring and control Data security
Semester of studies	1 st semester
Module duration	1 semester
Semester hours per week	4
Frequency of the module offer	Every semester
Amount of assigned credit points	5

Total workload (per elective)	150 h	Contact time	45
		Self-study time	105
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.): BAA 51 Professional Air Traffic Management Aviation Management and Piloting – dual (B.Sc.): Wahlpflichtmodule		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Karsten Benz		
Module lecturer(s)	Prof. Dr. Karsten Benz, Jörg Buxbaum (DFS)		
Instruction language	English		
Examination type / requirements for assigning credit points	E-examination (value: 100%)		
Duration of examination	120 min		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	The course is taught through lectures explaining the basic principles and theory of the discipline. Exercises are focused on practical topics presented in lectures.		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Excursion: • Campus Langen (LIZ, Academy, Research Center)		
Literature (compulsory reading / additional recommended literature)	• Nolan, Michael S. (2010) Fundamentals of Air Traffic Control, 5 ed., Delmar • Marina Efthymiou (ed.) (2023) Air Traffic Management Principles, Performance, Markets • Margaret Arblaster (2018) Air traffic management : Economics, regulation and governance Literature recommendations are adapted and customised by the lecturer		

Introduction to Aviation Management			
Module-No./ Code	ATM 13		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Introduction to Aviation Management		
Trained competencies	Professional Skills		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • recognize and interpret a range of important practical aspects of the aviation industry, • interpret relations of global air transport system structures, key international air laws and policies, and airline commercial operations and their impact on airline economics and finances, • discuss the various factors influencing the global air transport system, the types of and major functions of airports, describe basic principles of airline commercial economics and air cargo management, • identify competing objectives and constraints in the context of the aviation industry, • effectively communicate management ideas and practices in English.		
Syllabus plan	• Basics of commercial aviation: Key players, introduction to air law, deregulation and liberalization, demand development • Airline management (focus on passenger airlines): Basic terms, traffic figures, key figures of Lufthansa, competitive strategies • Airport management: Basic terms, traffic figures, aeronautical and non-aeronautical business • Air cargo management: Basic terms, differences to passenger business		
Semester of studies	1 st semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.)		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Richard Klophaus		
Module lecturer(s)	Prof. Dr. Richard Klophaus		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written examination (value: 100%)		
Duration of examination	120 min		

Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures, discussions, reading, script and case studies
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	The Global Airline Industry, Peter Belobaba, Amedeo Odoni, Cynthia Barnhart (MIT, 2016)

Business English			
Module-No./ Code	ATM 14		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Business English		
Trained competencies	Professional Skills Methodological Competence Social Skills Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students are expected to be able to • recall, explain, interpret, and paraphrase advanced business English vocabulary, including, but not limited to, aviation-related terminology, • identify, and differentiate between, text types that are commonly used in business communication, recognizing their various extent of language complexity, • apply various text/speech production strategies (in particular: generalizing vs. specifying), considering different linguistic registers/styles and the particular purpose of a text, • communicate effectively and adequately in a business setting (considering the particular requirements of different addressee/s), • critically evaluate their individual proficiency and application of the target language in various contexts and settings (in particular: identify individual language strengths and weaknesses, mistakes, and also potential mistakes and typical “pitfalls”/mother tongue interferences).		
Syllabus plan	Alternating topics in the context of professional business and aviation-related terminology (e.g., advertising material; documentation/reporting; press releases; websites; newspaper articles; articles from journals; interviews; job descriptions; contracts).		
Semester of studies	1 st semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.)		
Prerequisites	None		
Module co-ordinator	Munir Qureshi, Dipl.-Übers.		
Module lecturer(s)	Munir Qureshi, Dipl.-Übers.		
Instruction language	English		
Examination type / requirements for assigning credit points	E-examination (75%) + presentation (including impromptu Q & A Session) (25 %)		

Duration of examination	E-examination (120 min) + presentation (including impromptu Q & A Session) (15-30 min)
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading/self-study, written and oral exercises in classroom-based tuition; text and speech production incl. feedback from the lecturer. In order to respond to the variety of professional language requirements, audio-visual aids/teaching material will be included along with written texts, in particular: authentic texts and videos..
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	This course is attended by students with highly heterogeneous target language skills, mother tongues, and/or backgrounds. Therefore, minor amendments and adaptations to the syllabus might be required from time to time so as to respond to the specific requirements of a particular group.
Literature (compulsory reading / additional recommended literature)	• Business Proficiency, Wirtschaftsenglisch für Hochschule und Beruf, Klett, Neuauflage 2017 • English for Financial Institutions, Bibliothèque Nationale de Luxembourg 2020 • Vocabulary lists and exercises (provided by lecturer) • Recommended (daily) reading tips: https://www.bloomberg.com/businessweek; https://www.ft.com/ (Financial Times); https://hbr.org/ (Harvard Business Review); http://www.aviationnews-online.com/; https://www.aerotelegraph.com/en/; https://simpleflying.com/category/aviation-news/; https://www.washingtonpost.com/business/; https://www.youtube.com/c/SimpleFlyingNews (listening skills)

Analytical Methods			
Module-No./ Code	ATM 15		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	ATM 151 Mathematics ATM 152 Statistics		
Trained competencies	Professional Skills Methodological Competence Social Skills Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to ATM 151: - understand and apply fundamental mathematical concepts such as algebra and calculus, - apply different solution techniques for equation systems, optimization problems, also including constraints, - convert basic problems of financial economics into mathematic formulations and solve them, develop critical, structured, analytical thinking skills. ATM 152: - use basic methods of descriptive statistics, - apply frequently used probability distributions to statistical problems, - analyse economic problems using appropriate statistical methods.		
Syllabus plan	ATM 151: Mathematical methods with applications to business and economics. Topics include functions, graphs, properties of functions, equations and identities, slopes and intercepts, derivatives, optimization, and basic financial mathematics. Arithmetic, algebra, coordinate geometry in the plane, graphs. Elementary calculus, differentiation and integration with interpretation and applications. Logarithmic and exponential functions. ATM 152: Introduction to basic statistical concepts. Types of variables. Data presentation. Data summarization. Measures of central tendencies. Measures of dispersion. Linear regression and correlation Probability and probability rules. Random variables. Probability distributions. Hypothesis testing. Probability Distribution Random variables. Inference. Confidence intervals and hypothesis testing.		
Semester of studies	1 st semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h

Module type (compulsory, optional, etc.)	Compulsory
Applicability of the module for other courses of study	ATM 151 Mathematics: Aviation Management (B.A.): BAA 151 Mathematics Aviation Management and Piloting – dual (B.Sc.): AMP 121 Mathematik ATM 152 Statistics: Aviation Management (B.A.): BAA 152 Statistics
Prerequisites	None
Module co-ordinator	Prof. Dr. Tobias Grosche
Module lecturer(s)	ATM 151: Prof. Dr. Tobias Grosche ATM 152: Prof. Dr. Matthias Viehmann
Instruction language	English
Examination type / requirements for assigning credit points	ATM 151: Written examination ATM 152: E-examination
Duration of examination	120 min
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, script
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	ATM 151: - Essential Mathematics for Economic Analysis, Knut Sydsaeter, Peter Hammond, Arne Strom, Andres Carvajal, 6th edition (2022). ATM 152: - Moore et al.: Introduction to the Practice of Statistics, 10th ed., New York, 2021.

Research Methods, Presentation and Soft Skills			
Module-No./ Code	ATM 20		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	ATM 201 Research Methods and Presentation Skills ATM 202 Soft Skills		
Trained competencies	Methodological Competence Social Skills Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to ATM 201 • write scientific papers, • review and analyse research publications, • explain different research techniques, • formulate research questions, • use different presentation techniques according to the situation. ATM 202 • participate in an constructive and productive way in different situations of communication (conversations, discussions, presentations), • provide and accept productive criticism, • work as group in a positive and effective way and present the collaborative results as team.		
Syllabus plan	ATM 201: An introduction to the art and science of solving research problems and making students better users of research. Explores the key elements of preparation, organization and delivery of a paper and presentation. An introduction of a style manual for the preparation of a research proposal. Elements of effective communication. Preparing, structuring and delivering presentations. ATM 202: Training in communication, personality, presenting, time management, self-management		
Semester of studies	2 nd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	4		
Total workload	120 h	Contact time	45 h
		Self-study time	75 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Knowing how to do and to present research is a key qualification for any student and thus can be applied to any other courses of study in which students have to do presentations and/or compose seminar papers and theses. Developing adequate soft skill is necessary for any study/work environment and thus can be		

	applied in any other courses of study where interaction with or collaboration between students is required/desired.
Prerequisites	None
Module co-ordinator	Prof. Dr. Erik Hemmer
Module lecturer(s)	ATM 201: Prof. Dr. Erik Hemmer ATM 202: Ann-Sophie Menne
Instruction language	English
Examination type / requirements for assigning credit points	ATM 201: Preparation of research paper ATM 202: Team work with subsequent team presentation
Duration of examination	ATM 201: 9-11 pages ATM 202: 20-30 minutes
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,35%
Teaching and learning methods	Lectures, script, individual paper preparation, discussion
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	ATM 201: - Research Methods for Business Students, Mark Saunders, Philip Lewis, Adrian Thornhill, 7th edition (2016) ATM 202: - Personality Development and Soft Skills, B. Mitra (2012) - Soft Skills: Know Yourself & Know the World, K. Alex, (2010)

Accountancy and Financial Reporting			
Module-No./ Code	ATM 21		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Accountancy and Financial Reporting		
Trained competencies	Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • define and describe the elements of financial information to be provided periodically by companies according to International Accounting Rules set by the International Accounting Standards Board, • explain the basic and underlying accounting rules set by the International Accounting Standards Board, • demonstrate and to interpret the link and the basic differences between single elements of financial information, especially between statement of financial position, statement of financial performance and cash flow statement, • examine business issues and determine the respective accounting treatment, • judge case studies with several business issues by reference to the accounting examples presented in class and to select the respective required accounting treatment, • develop the required accounting treatment for business issues presented, including developing the statement of financial position and income statement for case studies provided.		
Syllabus plan	• Reasons for and the meaning of Accounting & Financial Reporting • The IFRS conceptual framework for financial reporting • Accounting transactions and journal entries • Accounting for Capital Market communication • General requirements for recognition and valuation • Elements of financial reporting		
Semester of studies	2 nd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.)		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Juliane Wutzler		
Module lecturer(s)	Prof. Dr. Juliane Wutzler		
Instruction language	English		

Examination type / requirements for assigning credit points	E-examination (value: 100%)
Duration of examination	120 min
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading, script, use of spreadsheet programs
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	For basic accounting: - Weygandt, Jerry/ Kimmel, Paul/ Kieso, Donald (2018): Financial Reporting with International Financial Reporting Standards, 4th edition, John Wiley & Sons, Hoboken. For advanced concepts: - Doupnik, Timothy/ Finn, Mark/ Gotti, Giorgio/ Perera, H. (2019): ISE International Accounting, 5th edition, McGraw - Hill Higher Education, New York.

Marketing and Sales Management	
Module-No./ Code	ATM 22
Course of studies	Air Traffic Management – dual (B.Sc.)
Courses of the module	Marketing and Sales Management
Trained competencies	Professional Skills Methodological Competence Social Skills Self-competence
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • explain the necessity, changing role and probable future direction of marketing in a free market economy, • describe the fundamental idea behind marketing and the marketer's role within a firm as "the customer's advocate", • differentiate and evaluate alternative conceptions of marketing, • analyse B2C and the related consumer buying behaviour as well as B2B markets and the related institutional buying behaviour, • describe and discuss fundamental marketing techniques like market segmentation, target marketing, and positioning, • explain, distinguish, and discuss basic elements of the marketing mix and the related management concepts concerning the following policies: branding, product and production line, pricing, sales and distribution, and communication, • apply basic marketing techniques like segmentation, target marketing, and mix policies to case studies presented in the lectures.
Syllabus plan	A. Foundations of Marketing • Defining Marketing • Historical Preconditions of Marketing • Different Aspects of the Marketing Concept • Foundations of Services Marketing B. The Marketing Environment • Microenvironment • Macroenvironment C. Consumer Behaviour and Market Segmentation Introduction: Current Shifts in Consumer Behaviour • Conceptual Framework of Consumer Behaviour • Buying Decision Process • Market Segmentation and Segmentation Variables • Market Targeting and Positioning D. Marketing Mix Management: Basic Elements of • Branding Policy • Product and Product Line Policy • Price Policy
Semester of studies	2 nd semester
Module duration	1 semester
Semester hours per week	4
Frequency of the module offer	Every semester

Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.)		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Hans Rück		
Module lecturer(s)	Prof. Dr. Hans Rück		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written examination (value: 100%)		
Duration of examination	120 min		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	Lectures and tutorials, discussions, reading, script		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)			
Literature (compulsory reading / additional recommended literature)	• Kotler & Keller: Marketing Management, 14th ed. • Kotler & Bowen & Make: Marketing for Hospitality and Tourism, 6th ed.		

Air Transportation Policy and Law			
Module-No./ Code	ATM 23		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Air Transportation Policy and Law		
Trained competencies	Professional Skills Methodological Competence Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • define basic motivation, logic of regulation and deregulation in international air transport and airports (in the EU), • define underlying terms and conditions as well as concrete areas and tools of regulation in international air traffic , • repeat and classify institutions and authorities on national and supra national level that are responsible for transport policy, • memorise and describe other relevant international organizations in the aviation industry, • analyse and evaluate recent developments pertaining to consolidation and changing market-environments due to new business models and increasing competition.		
Syllabus plan	The course provides a comprehensive state-of-the-art survey of air transportation policy and law policy issues. The strategic, economic and regulatory issues confronting airlines and airports are addressed. The course comprises the theoretical basis of the most important air transport related laws. Numerous case studies ensure the practical application of the most relevant articles within the laws. Transportation regulation and public policy, regulatory frameworks and decision processes are explained. A special emphasis is placed on deregulation. Logic and history of deregulation are described followed by an analysis of the consequences for the competitive situation. Environmental issues and taxation – in general and specifically for airlines and airports are integrated as well as the sectors safety and security. Finally the students are confronted with consolidation trends and novel constellations in the international aviation markets		
Semester of studies	2 nd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.): Wahlpflichtmodule		

Prerequisites	None
Module co-ordinator	Prof. Dr. Klaus Jäckel
Module lecturer(s)	Prof. Dr. Klaus Jäckel, Prof. Dr. Tobias Ehlen
Instruction language	English
Examination type / requirements for assigning credit points	Final written examination (value: 100%)
Duration of examination	120 min
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading, script
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	A guest lecture (managers from Lufthansa, IATA etc.) is integrated into the module as a standard.
Literature (compulsory reading / additional recommended literature)	• Giemulla/Schwenk, Handbuch des Luftverkehrsrechts, 4. Auflage 2013 • Bartsch, International Aviation Law: A Practical Guide, 2012

Network Management and Scheduling			
Module-No./ Code	ATM 24		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Network Management and Scheduling		
Trained competencies	Professional Skills		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • judge broad aspects of managing airlines, • relate the basic ideas, concepts and techniques of network management and scheduling, • explain what drives passenger demand, • interpret passenger demand forecasting techniques and data sources, • describe how decision support systems including operational research methods support in the airline scheduling process, • judge the benefits/potential and drawbacks of different airline scheduling decisions, • sketch the process of airline scheduling from long-term forecasting to ad-hoc operations control.		
Syllabus plan	Key elements of the airline's planning process – fleet planning, network and schedule planning, resource assignment, operations control: • airline scheduling process • fleet planning • market demand estimation • data management • network structures • flight scheduling • fleet assignment • aircraft maintenance routing • crew assignment • irregular operations • IT in airline scheduling		
Semester of studies	2 nd semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	33,75 h
		Self-study time	116,25 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.): Wahlpflichtmodule		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Tobias Grosche		
Module lecturer(s)	Prof. Dr. Tobias Grosche		

Instruction language	English
Examination type / requirements for assigning credit points	Final written examination (value: 100%)
Duration of examination	90 min
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading, script
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Abdelghany, A. & Abdelghany, K.: Airline Network Planning and Scheduling, Wiley. • Belobaba, P., Odoni, A., Barnhart, C.: The Global Airline Industry, Wiley. • Billig, B. & Cook N., G.: Airline Operations and Management: A management textbook, Routledge • Clark, P.: „Buying the Big Jets, Routledge. • Doganis, R.: „Flying Off Course. Airline Economics and Marketing, Routledge. • Goedeking, P.: Networks in Aviation, Springer. • Holloway, S.: „Straight and Level: Practical Airline Economics, Routledge. • Wensveen, G. J.: „Air Transportation“, Routledge.

Aviation Analytics			
Module-No./ Code	ATM 25		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Aviation Analytics		
Trained competencies	Professional Skills Methodological Competence Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • Examine and experiment with aviation data Develop estimation and forecasting models • Select proper techniques for visualization of data • Explain basic concepts of Operations Research (OR) • Use applications for data processing • Identify structures in data • Select data sources for analysis		
Syllabus plan	• Foundations of data processing and information technology • Basics of Operations Research (OR) • Application of data processing and visualization software • Quantitative Modeling • Data gathering, extraction and analysis • Business Intelligence and Data Science		
Semester of studies	2 nd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	6		
Total workload	180 h	Contact time	45 h
		Self-study time	135 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.)		
Prerequisites	Completion of ATM 15 Analytical Methods and ATM 11 Introduction to Economics is recommended		
Module co-ordinator	Prof. Dr. Matthias Viehmann		
Module lecturer(s)	Prof. Dr. Erik Hemmer, Prof. Dr. Matthias Viehmann		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written / computer-based examination (value: 100%)		
Duration of examination	120 min		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	3,53%		
Teaching and learning methods	Lectures, discussions, reading, script, home exercises, computer exercises		
Special characteristics of the module (e.g. online teaching and			

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Data Analytics: Models and Algorithms for Intelligent Data Analysis, Thomas Runkler, 2nd edition, 2016. • Microsoft Excel Data Analysis and Business Modeling, Wayne Winston, 2016. • Introduction to Operations Research, Frederick Hillier and Gerald Liebermann, 2014. • Business Intelligence and Analytics: Systems for Decision Support, Efraim Turban and Ramesh Sharda, 2014.

Aircraft Operation			
Module-No./ Code	ATM 30		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Aircraft Operation		
Trained competencies	Professional Skills		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • explain the fundamental principles behind the design of an aircraft, • define basic terms and concepts of aircraft operation • describe of flight operations that are managed by an airline • identify the internal and external factors that impact flight operations • explain and recognize basics of aircraft systems and performance, navigation and meteorology.		
Syllabus plan	• Flight Principles • Aircraft Performance • Aircraft Systems • Navigation • Meteorology • Flight Operations		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Every semester		
Amount of assigned credit points	4		
Total workload	120 h	Contact time	33,75 h
		Self-study time	86,25 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.)		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Tobias Grosche		
Module lecturer(s)	Prof. Dr. Tobias Grosche		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written examination (value: 100%)		
Duration of examination	90 min		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,35%		
Teaching and learning methods	Lectures and tutorials, discussions, reading, script		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)			

Literature (compulsory reading / additional recommended literature)	• The Global Airline Industry, Belobaba/Odoni/Barnhart, 2nd edition (2015) • Pilot's Handbook of Aeronautical Knowledge, FAA, US Department of Transportation
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Elective Seminar Tourism and Travel Management

Reiseveranstalter-/mittlermanagement			
Module-No./ Code	ATM 311		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Reiseveranstalter-/mittlermanagement		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of tour operator / travel agent management • create a scientific paper independently • use economic and / or socio-scientific methods in the context of tour operator/ travel agent management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of tour operator /travel agent management		
Syllabus plan	Selected problems in the area of tour operators and travel agents: • As part of the tourism value chain • Market structure • Legal and economic aspects • Market role • Product design and product elements of tour operators • Purchasing of travel services, significance of different service providers • Classical and dynamic production of package tours • Destination area and incoming agencies • Travel Technology • Structure of tourism sales channels, especially online distribution • Marketing • Global Distribution Systems, Internet Booking Engines		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		

Applicability of the module for other courses of study	Tourism and Travel Management (B.A.)
Prerequisites	None
Module co-ordinator	Prof. Dr. Jan Mauelshagen
Module lecturer(s)	Prof. Dr. Jan Mauelshagen
Instruction language	German
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%
Duration of examination	Seminar paper (15 pages) and presentation (20-30 min)
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customized.

Verkehrsträgermanagement			
Module-No./ Code	ATM 312		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Verkehrsträgermanagement		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of transport management • create a scientific paper independently • use economic and / or socio-scientific methods in the context of transport management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of transport management		
Syllabus plan	• Application of business methods (general management methods, marketing methods, etc.) on specific issues in transport management • Selected problems in the area of transport management (fundamental issues as well as current issues) • All transport modes (air, sea/river, road, rail)		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		
Applicability of the module for other courses of study	Tourism and Travel Management (B.A.): 502/602 Verkehrsträgermanagement		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Tim Sterzenbach		
Module lecturer(s)	Prof. Dr. Erik Hemmer, Prof. Dr. Tim Sterzenbach		
Instruction language	German		
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%		
Duration of examination	Seminar paper (15 pages) and presentation (20-30 min)		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		

Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customized.

Destinationsmanagement			
Module-No./ Code	ATM 313		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Destinationsmanagement		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of destination management • create a scientific paper independently • use economic and / or socio-scientific methods in the context of destination management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of destination management		
Syllabus plan	• Application of business methods (general management methods, marketing methods, etc.) on specific issues in touristic destinations		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		
Applicability of the module for other courses of study	Tourism and Travel Management (B.A.): 503/603 Destinationsmanagement		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Knut Scherhag		
Module lecturer(s)	Prof. Dr. Knut Scherhag		
Instruction language	German		
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%		
Duration of examination	Seminar paper (15 pages) and presentation (20-30 min)		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work		

Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customized.

Hotelmanagement			
Module-No./ Code	ATM 314		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Hotelmanagement		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of hotel management • create a scientific paper independently • use economic and / or socio-scientific methods in the context of hotel management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of hotel management		
Syllabus plan	Contents • Familiarization with a scientific topic • Presenting that topic Topic areas: • Developments in the hotel industry • Operational management of the hotel business • Quality management • Marketing as a management field • Human Resources Management • E-Business in the hotel industry • Investment and financing models of hotel real estates • Development of hotel real estates • Accountancy and Financial Reporting with focus on the hotel industry • Controlling in the hotel industry		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		
Applicability of the module for other courses of study	Tourism and Travel Management (B.A.): 504/604 Hotelmanagement		
Prerequisites	None		

Module co-ordinator	Prof. Dr. Dagmar Hettinger
Module lecturer(s)	Prof. Dr. Dagmar Hettinger
Instruction language	German
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%
Duration of examination	Seminar paper (15 pages) and presentation (20-30 min)
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Benz, Christoph (2011): Touristikkostenrechnung. Management-Accounting für Touristik-Unternehmen, 1. Aufl., Wiesbaden: Gabler Verlag / Springer Fachmedien Wiesbaden GmbH Wiesbaden. • Dettmer/Hausmann (Hg.) (2012): Organisations-/Personalmanagement und Arbeitsrecht: in Hotellerie und Gastronomie, 3. Aufl., Handwerk und Technik. • Freyberg, Burkhard von (Hg.) (2014): Hospitality Controlling. Erfolgreiche Konzepte für die Hotellerie. 2., neu bearb. Aufl. Berlin: Schmidt. • Freyberg, Burkhard von; Gruner, Axel; Lang, Marina (2012): ErfolgReich in der Privathotellerie, Stuttgart, Matthaes Verlag. • Gardini, Marco A. (2015): Marketing-Management in der Hotellerie. 3. überarbeitete und aktualisierte Auflage, München, Wien, Oldenbourg. • Gardini, Marco A. (Hg.) (2009): Handbuch Hospitality Management. Managementkonzepte, Wettbewerbskontext, Unternehmenspraxis, Frankfurt a. Main, Dt. Fachverl. • Gardini, Marco A (Hg.) (2011): Mit der Marke zum Erfolg. Markenmanagement in Hotellerie und Gastronomie, Stuttgart, Matthaes. • Gardini, Marco A. (2014): Grundlagen der Hotellerie und des Hotelmanagements. Hotelbranche - Hotelbetrieb – Hotelimmobilie, 2. überarbeitete Auflage, München, Oldenbourg, Wissenschaftsverlag. • Goerlich, Barbara (2008): Das Revenue Management Buch. Wie Sie die Erträge Ihres Hotels steigern, Unter Mitarbeit von Bianca Spalteholz, Bonn, INTERHOGA. • Gruner, Axel; Berg, Waldemar (Hg.) (2008): Management-Lexikon. Hotellerie & Gastronomie, Frankfurt am Main, Dt. Fachverl. (Hospitality Management). • Gugg, Eberhard; Hank-Haase, Gisela (2005): Das Budget in der Hotellerie. Mit erfolgreicher Finanzplanung die Zukunft sichern, Gastgewerbliche Schriftenreihe 65, 5. überarb. Aufl., INTERHOGA. • Hanni Rützler Harry Gatterer (2012): Hotel der Zukunft, Matthaes Verlag.

- Hänssler, Karl Heinz (Hg.) (2011): Management in der Hotellerie und Gastronomie. Betriebswirtschaftliche Grundlagen, 8. vollst. aktualisierte und überarb.Auflage, München, Oldenbourg.
- Henschel, Karla; Gruner, Axel; Freyberg, Burkhard von (2013): Hotelmanagement, 4. Aufl., München, Oldenbourg (Edition Dienstleistungsmanagement).
- Hotel Association of New York City: Uniform System of Accounts for the Lodging Industry, 10th rev. ed (2006), Lansing, Mich: American Hotel & Lodging Educational Inst.
- Hotelverband Deutschland (IHA) e. V. (Hg.) (2015): Hotelmarkt Deutschland. Branchenreport des Hotelverbandes Deutschland (IHA). Konjunktur, Angebots- und Nachfrageentwicklung, ausgewählte Marktsegmente, Benchmarking, Markenhotellerie, Hotelklassifizierung, Normung, Lobbying, Bonn, IHA-Service.
- Huber, Heinz (2009): STAHR, Standard der Abrechnung für Hotels und Restaurants, Trauner Verlag.
- Jahns, Christopher; Walter, Stefan; Schöffler, Christine (2006): Einkauf in der Hotellerie, Status und Perspektiven in der 3- bis 5-Sterne-Hotellerie, Wissenschaft & Praxis.
- Kotler, Philip; Bowen, John T.; Makens, James C. (2014): Marketing for hospitality and tourism, 6. ed., internat. ed. Boston, Mass., Pearson.
- Pizam, Abraham (Hg.) (2010): International Encyclopedia of Hospitality Management, 2. Aufl., Butterworth-Heinemann.
- Schaetzing, Edgar E. (2009): Modernes Housekeeping-Management. Erfolgreiche Planung, Organisation und Kontrolle, Frankfurt am Main, Deutscher Fachverlag.
- Schaetzing, Edgar E. (2009): Management in Hotellerie und Gastronomie. 8., überarbeitete und erweiterte Auflage: Deutscher Fachverlag.
- Schulz, Axel; Weithoener, Uwe; Goecke, Robert (Hg.) (2010): Informationsmanagement im Tourismus. E-Tourismus: Prozesse und Systeme. 1. Aufl. München: Oldenbourg.
- Soller, Jörg; Hasse, Dieter (2008): Finanzierungsleitfaden Mittelstandshotellerie. Strategien und Konzepte für dauerhaften Erfolg, Berlin, Schmidt.
- Soller, Jörg; Laux, Silke (Hg.) (2012): Erfolgsfaktor Kooperation im Tourismus. Wettbewerbsvorteile durch effektives Stakeholdermanagement. Berlin: Erich Schmidt Verlag.
- Weber, Wilhelm Konrad; Kurz, Michael (2012): Moderne Kennzahlen für Hotellerie und Gastronomie: Finanz- und Revenue- Management nach europäischem Standard, Books on Demand (Kindle Edition).

Business Travel Management			
Module-No./ Code	ATM 315		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Business Travel Management		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of business travel management • create a scientific paper independently • use economic and / or socio-scientific methods in the context of business travel management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of business travel management		
Syllabus plan	Selected problems in the area of business travel management (fundamental issues as well as current issues)		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		
Applicability of the module for other courses of study	Tourism and Travel Management (B.A.): 505/605 Business Travel Management		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Andreas Wilbers		
Module lecturer(s)	Prof. Dr. Andreas Wilbers		
Instruction language	German		
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%		
Duration of examination	Seminar paper (15 pages) and presentation (20-30 min)		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work		
Special characteristics of the module (e.g. online teaching and			

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customized.

Eventmanagement			
Module-No./ Code	ATM 316		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Eventmanagement		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of event management • create a scientific paper independently • use economic and / or socio-scientific methods in the context of event management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of event management		
Syllabus plan	Selected problems in the area of event management (fundamental issues as well as current issues)		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		
Applicability of the module for other courses of study	Tourism and Travel Management (B.A.): 506/606 Eventmanagement		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Jan Drengner		
Module lecturer(s)	Prof. Dr. Jan Drengner		
Instruction language	German		
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%		
Duration of examination	Seminar paper (15 pages) and presentation (20-30 min)		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work		
Special characteristics of the module (e.g. online teaching and			

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	Basic literature: • Allen, J. (2009): Event Planning, 2. Aufl., Mississauga. • Drengner, J. (2008): Imagewirkungen von Eventmarketing. Entwicklung eines ganzheitlichen Messansatzes. 3. Aufl., Wiesbaden. • Funke, E.; Müller, G. (2009): Handbuch zum Eventrecht. 3. Aufl. Köln. • Goldblatt, S. d. B. (2012): The Complete Guide to Greener Meetings and Events. Hoboken. • Nickel, O. (Hrsg.) (2007): Eventmarketing. Grundlagen und Erfolgsbeispiele, 2. Aufl., München. • Nufer, G. (2011): Event-Marketing und -Management. Grundlagen – Planung – Wirkungen – Weiterentwicklungen. 4. Aufl., Wiesbaden. • Zanger, C. (Hrsg.) (2013): Events im Zeitalter von Social Media, Wiesbaden. • Zanger, C. (Hrsg.) (2012): Erfolg mit nachhaltigen Eventkonzepten. Wiesbaden. • Zanger, C. (Hrsg.) (2010): Stand und Perspektiven der Eventforschung, Wiesbaden. As well as scientific journals and magazines, e.g. Event Management, Festival Management & Event Tourism, International Journal of Event and Festival Management, Journal of Convention & Event Tourism. As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customized.

Tourism and Travel Management			
Module-No./ Code	ATM 317		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Tourism and Travel Management		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • execute independent scientific work on a topic in the area of tourism and travel management, • create a scientific paper independently • use economic and / or socio-scientific methods in the context of tourism and travel management, • organize a presentation of the results in a suitable form in front of the group, • organize subsequent discussion, and the ability to defend their opinions in a sound manner, • differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions, • appraise, argue and defend a stand on a specific issue from the area of tourism and travel management.		
Syllabus plan	• Application of business methods (general management methods, marketing methods, etc.) on specific issues in tourism and travel management • Selected problems in the area of tourism and travel management (fundamental issues as well as current issues), mainly from the aviation sector		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload (per elective)	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory elective module		
Applicability of the module for other courses of study	Aviation Management (B.A.): BAA 50 Elective Seminar Tourism and Travel Management		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Karsten Benz		
Module lecturer(s)	Prof. Dr. Karsten Benz		
Instruction language	English		
Examination type / requirements for assigning credit points	Seminar paper (50%), presentation (50%) and session attendance of at least 80%		
Duration of examination	Seminar paper (15 pages) and presentation (15 min + at least 5 min presentation)		
Examination graded / not graded	graded		

Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Seminar with seminar paper and short presentation, moderated discussions, content review by lecturer, group work
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customized.

Human Resources Management and Organizational Development			
Module-No./ Code	ATM 32		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Human Resources Management and Organizational Development		
Trained competencies	Professional Skills Personal Skills Methodological competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • define basic terms, concepts and tasks in Human Resources Management (HRM) and Organizational Development, • describe critical HRM issues and challenges, their implications for stakeholders and the challenges of successfully managing them, • explain effects of individual and group behaviour on organizational processes and outcomes, • apply methods and practices to formulate HR processes & strategies, design organisations and run smaller projects.		
Syllabus plan	Theoretical and practical aspects of HRM in a global perspective. Practical features are studied through cases. Further topics include theory and practice of change, transformation and development in organization. Integration of the individual into the organization by studying the current and fundamental issues in organization theory and organizational behaviour as they relate to the individual. The effectiveness of the individual in the organization is examined in terms of personal traits such as communicative abilities, leadership style and potential, and beliefs about organizational ethics and social responsibility and are illustrated using practical case studies.		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	33,75 h
		Self-study time	116,25 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting (B.Sc.): Wahlpflichtmodule		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Klaus Jäckel		
Module lecturer(s)	Prof. Dr. Klaus Jäckel		
Instruction language	English		

Examination type / requirements for assigning credit points	Final written examination (value: 100%)
Duration of examination	90 min
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, discussions, reading, script
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	No compulsory readings. Extensive recommended literature to aspects of HRM/ORG DEV is provided during the course.

Airport Management			
Module-No./ Code	ATM 33		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Airport Management		
Trained competencies	Professional Skills Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • understand and describe broad aspects of managing airports as an essential player within the coherent scheme of the aviation industry (so called “system partnership”), • classify categories and types of airports, name airport organisations, • describe basic elements and structures of terminal management, runway systems and ramp management, • differentiate aviation and non-aviation business areas and the respective costs and revenues, • define and analyse typical performance parameters for airports, • recognize areas and impact of deregulation in the airport sector, • explain and analyse competitive situation of airports, • identify relevant business trends and their implications.		
Syllabus plan	Presentation of the role of airports in the aviation system, categories and ranking of airport, specifics of airport cost and revenues, competition among airports, regulatory issues and deregulation of ground handling services within the EU.		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	33,75 h
		Self-study time	116,25 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.): Wahlpflichtmodule		
Prerequisites	Completion of ATM 13 Introduction to Aviation Management is recommended		
Module co-ordinator	Prof. Dr. Christoph Klingenberg		
Module lecturer(s)	Prof. Dr. Christoph Klingenberg		
Instruction language	English		
Examination type / requirements for assigning credit points	E-examination (value: 100%)		
Duration of examination	90 min		
Examination graded / not graded	graded		

Weighting of the mark within the cumulative grade	2,94%
Teaching and learning methods	Lectures and tutorials, guest speakers, discussions, reading, script
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Managing Airports: An International Perspective, Anne Graham, (latest edition) • Airport Planning & Management, Alexander T. Wells, Seth B. Young, 5th edition (latest edition)

Aviation and Environment			
Module-No./ Code	ATM 34		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Aviation and Environment		
Trained competencies	Professional Skills Methodological Competence Self-competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • describe relevant environmental issues in aviation, • identify the perspectives of the different stakeholders with respect to environmental issues, • discuss design and effects of policy instruments for environmental protection, • explain principles and instruments of sustainability, • use their knowledge to develop ideas for a sustainable airline and airport management.		
Syllabus plan	• Principles and definitions • Environmental effects of air transport ◦ GHG, pollutants, noise • Policy instruments for environmental protection ◦ Standards, incentives, ETS, land use planning • Environmental management ◦ Airlines, airports		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	33,75 h
		Self-study time	116,25 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.): Wahlpflichtmodule		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Frank Fichert		
Module lecturer(s)	Prof. Dr. Karsten Benz, Prof. Dr. Frank Fichert, Prof. Dr. Tobias Grosche		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written examination (value: 100%)		
Duration of examination	90 min		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	Lectures and tutorials, discussions, reading, script		

Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Fichert, F. / Forsyth, P. / Niemeier, H.-M. (eds.) (2020): Aviation and Climate Change. Economic Perspectives on Greenhouse Gas Reduction Policies, Abingdon / New York: Routledge. • Daley, B. (2010), Air Transport and the Environment, Farnham / Burlington • Walls, J.L. / Wittmer, A. (eds.) Sustainable Aviation – A Management Perspective, St. Gallen, 2022 • Sustainability reports of airlines, airports, air navigation service providers and industry organisations

Airline Business Models and Strategies			
Module-No./ Code	ATM 35		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Airline Business Models and Strategies		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • report broad aspects of managing airlines, • explain the options of strategic choice in airline management, • locate relevant business trends and their implications, • understand and execute knowledge regarding business models, • describe the most relevant strategy methods in business administration.		
Syllabus plan	The rise of the low cost carrier, and the markets response. The future airline business, and the evolution of the low cost and network models. Revising business strategy The airline environment: legacy and low-cost carriers Marketing and commercial strategy development Loyalty programs Airline alliances and cross-industry partnerships: strategies.		
Semester of studies	3 rd semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	5		
Total workload	150 h	Contact time	45 h
		Self-study time	105 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.): Wahlpflichtmodule		
Prerequisites	Completion of ATM 13 Introduction to Aviation Management is recommended		
Module co-ordinator	Prof. Dr. Klaus Jäckel		
Module lecturer(s)	Prof. Dr. Klaus Jäckel, R. König		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written examination (value: 100%)		
Duration of examination	120 min		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		
Teaching and learning methods	Lectures and tutorials, guest speakers, discussions, reading, script		
Special characteristics of the module (e.g. online teaching and	Excursion to airline		

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	• Conrady, R.: Low Cost Carrier in Western and Central Europe, in: The Low Cost Carrier Worldwide (eds.: S. Gross, M. Lück), Aldershot 2013, p. 19 – 37. • Gross, S./Lück, M. (eds.): The Low Cost Carrier Worldwide, Aldershot 2013. • Klopheus, R./Conrady, R./Fichert, F.: Low cost carriers going hybrid: Evidence from Europe, in: Journal of Air Transport Management, 23, 2012, S. 54 – 58. • Osterwalder, A./Pigneur, Y.: Business Model Generation, Hoboken 2010.

Elective Seminar Aviation Management			
Module-No./ Code	ATM 54		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Elective Seminar Aviation Management		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • use concepts and methods used in aviation management, • solve problems in the area of study by applying research methods, • develop effective time, self and stress management, • discuss specialized topics in aviation management, • use specialized business terms, definitions and descriptions of problems in various situations.		
Syllabus plan	Students elect to perform a special, directed study in an area of interest. Candidates must prepare a proposal for the desired topic and present the proposal to partnering company and academic supervisor for review. Proposals must be submitted at least four weeks prior to the start of the term in which the elective is being taken.		
Semester of studies	5 th semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Every semester		
Amount of assigned credit points	8		
Total workload	240 h	Contact time	45 h
		Self-study time	195 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	Aviation Management (B.A.) Aviation Management and Piloting – dual (B.Sc.)		
Prerequisites	Completion of ATM 13 Introduction to Aviation Management is recommended		
Module co-ordinator	Prof. Dr. Richard Klophaus		
Module lecturer(s)	Prof. Dr. Karsten Benz		
Instruction language	English		
Examination type / requirements for assigning credit points	Seminar paper (60%), class presentation (25%), peer review (15%) and session attendance of at least 80%		
Duration of examination	Seminar paper: 25 pages main text (text only), presentation 20 min + at least 5 min presentation, peer review based on a written report (5-10 minutes, 2-3 critical questions, written report of 2 pages)		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	4,71%		
Teaching and learning methods	Seminar type class including written assignment, presentation, peer review, discussions, reading, mentoring and supervision		

Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	See instructor

Thesis			
Module-No./ Code	ATM 61		
Course of studies	Air Traffic Management –dual (B.Sc.)		
Courses of the module	Thesis		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • organise an independent, systematic and clear treatment of a certain topic, • independently identify and analyze relevant problems, • solve a practical problem by a systematic use of an appropriate choice of theory and methodologies, • independently acquire and handle academic knowledge through independent studies of relevant literature, and • cultivate the ability to evaluate and briefly account for the central elements in a large literature base..		
Syllabus plan	Students perform a special, directed study in an area of interest. Candidates prepare a detailed proposal for the desired topic and present the proposal to partnering company and academic supervisor for review. The thesis is a written document on an aviation management topic supervised throughout its preparation by the student's Thesis Committee. The thesis demonstrates the student's mastery of the topic.		
Semester of studies	6 th semester		
Module duration	1 semester		
Semester hours per week	0		
Frequency of the module offer	Every semester		
Amount of assigned credit points	10		
Total workload	300 h	Contact time	0 h
		Self-study time	300 h
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	Completion of ATM 54 Elective Seminar Aviation Management is recommended At least 100 CP of all modules		
Module co-ordinator	Prof. Dr. Richard Klophaus		
Module lecturer(s)	various		
Instruction language	English		
Examination type / requirements for assigning credit points	Thesis		
Duration of examination	45-55 pages (text only)		
Examination graded / not graded	graded		

Weighting of the mark within the cumulative grade	11,76%
Teaching and learning methods	Mentoring and supervision
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	See instructor

Aeronautical English Oral			
Module-No./ Code	ATM 40		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Aeronautical English Oral		
Trained competencies	Communication		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • demonstrate the knowledge of aeronautical English • express themselves in an aeronautical environment • explain given situations in form of an interview		
Syllabus plan	• Introduction - o Basic questions and concepts • Aerodrome - o Layout - o Lightning - o Marking • Aircraft - o Shapes - o Components - o Noise		
Semester of studies	4 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	2		
Total workload	60 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	None		
Module co-ordinator	Bernd Schlebusch AK/AB		
Module lecturer(s)	English Aviation Team DFS Academy		
Instruction language	English		
Examination type / requirements for assigning credit points	Final oral exam Passmark: 75%		
Duration of examination	20 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	1,18%		
Teaching and learning methods	Lectures, discussions, work samples		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	A preparation of this course has to be done with a learning program that will be delivered to the students about six weeks prior the course start.		

Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i> . ICAO Doc. 4444, 16. Auflage. ICAO, Montreal
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Legal Bases and Aeronautical Basics			
Module-No./ Code	ATM 41		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Legal Bases and Aeronautical Basics		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this course with defined subjects, the students shall be able to • (DFS) demonstrate basic knowledge of the company structure of the DFS • (NLE) demonstrate basic knowledge of National Rules and Regulations in regard of aviation in Germany • (ATLA) demonstrate basic knowledge of Air Traffic Management Rules and Regulations • (ATLA) demonstrate basic knowledge of International Air Law • (RTF) explain the use of communication systems in aviation • (MET/NAV) explain the basic parameters in regard of altimetry and the atmosphere • (ACFT) explain the differences between aircraft drives and the interaction of forces on aircraft • (NAV) explain the different metering possibilities on the globe and differentiate between the ones used in aviation and others		
Syllabus plan	Generic aspects (not related to any specific environment): • Company structure of DFS • National Rules and Regulations in regard of aviation in Germany • Air Traffic Management Rules and Regulations • International Air Law • communication systems in aviation • altimetry and the atmosphere • aircraft physics • metering possibilities on the globe		
Semester of studies	4 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	7		
Total workload	210 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	None		
Module co-ordinator	Bernd Schlebusch		

Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G
Instruction language	English/German
Examination type / requirements for assigning credit points	Electronic Exam Passmark: 75%
Duration of examination	180 min.
Examination graded / not graded	Graded
Weighting of the mark within the cumulative grade	4,12%
Teaching and learning methods	Lectures, learning programs, interactive lessons
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	None
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2007): <i>Radio Telephony</i>. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2018): <i>Location Indicators</i>. ICAO Doc. 7910, 167. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2017): <i>Aircraft Type Designators</i>. ICAO Doc. 8643, 45. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2017): <i>Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services</i>. ICAO Doc. 8585, 182. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2005): <i>Rules of the Air</i>. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal Deutsche Flugsicherung (Hrsg.) (2017): <i>Bekanntmachung über die Sprechfunkverfahren</i>, NfL 1-1127-17, DFS, Langen (Hessen) Bundesministerium für Justiz und für Verbraucherschutz (Hrsg.): <i>Luftverkehrsgesetz</i>, Version 20.07.2017, Deutschland, Berlin DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel.

	Mensen, H. (2014): <i>Moderne Flugsicherung</i> . 4. Auflage. Springer-Verlag, Heidelberg		
Tower Operations and Aeronautical Basics			
Module-No./ Code	ATM 42		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Tower Operations and Aeronautical Basics		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this course, students shall be able to • (NLE) demonstrate basic knowledge of National Rules and Regulations in regard of aviation in Germany • (ATLA) demonstrate basic knowledge of Air Traffic Management Rules and Regulations • (ATLA) demonstrate basic knowledge of International Air Law • (RTF) explain the use of communication systems in aviation • (MET/NAV) explain the basic parameters in regard of altimetry and the atmosphere • (ACFT) explain the differences between aircraft drives and the interaction of forces on aircraft • (NAV) explain the different metering possibilities on the globe and differentiate between the ones used in aviation and others • (TWR PRESIM) describe the basic principles of air traffic management procedures in a Tower environment • (EQPS) explain the basic working principles of equipment that is in general use in ATC and appreciate how this equipment aids the controller in providing safe and efficient Air Traffic Service		
Syllabus plan	Aspects related to Tower environment: • National Rules and Regulations in regard of aviation in Germany • Air Traffic Management Rules and Regulations • International Air Law • communication systems in aviation • altimetry and the atmosphere • aircraft physics • metering possibilities on the globe • principles of air traffic management procedures in a Tower environment • equipment in use in ATC		
Semester of studies	4 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	7		
Total workload	210 h	Contact time	n/a

		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 41		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Electronic Exam Passmark: 75%		
Duration of examination	180 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	4,12%		
Teaching and learning methods	Lectures, learning programs, interactive lessons		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	• Use of Electronic Learning Programs (e.g. Location Indicators, Aircraft Recognition Program) • Simulation Exercises with clear correlation to the previously taught theory lesson • Field trip to an International Aerodrome Control Tower		
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2007): <i>Radio Telephony</i>. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2018): <i>Location Indicators</i>. ICAO Doc. 7910, 167. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2017): <i>Aircraft Type Designators</i>. ICAO Doc. 8643, 45. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2017): <i>Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services</i>. ICAO Doc. 8585, 182. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2005): <i>Rules of the Air</i>. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal Deutsche Flugsicherung (Hrsg.) (2017): <i>Bekanntmachung über die Sprechfunkverfahren</i>, NfL 1-1127-17, DFS, Langen (Hessen) Bundesministerium für Justiz und für Verbraucherschutz (Hrsg.): <i>Luftverkehrsgesetz</i>, Version 20.07.2017, Deutschland, Berlin		

	DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg
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Tower Procedures			
Module-No./ Code	ATM 43		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Tower Procedures		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this course, students shall be able to: (TWR SIM) describe the basic principles of air traffic management and apply basic operational procedures in a Tower environment.		
Syllabus plan	- principles of air traffic management in a Tower environment - basic operational procedures in a Tower environment		
Semester of studies	4 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	4		
Total workload	120 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 42		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Practical Test (Simulator) 13 Performance criteria. None is accepted to be marked with "partly achieved"		
Duration of examination	45min. - 60min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	2,35%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, simulator lessons		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Simulator exercise that shall prove, that the student is able to combine all learned procedures in an examination event.		
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2007): <i>Radio Telephony</i>. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal		

	International Civil Aviation Organisation (Hrsg.) (2005): <i>Rules of the Air</i>. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Deutsche Flugsicherung (Hrsg.) (2017): <i>Bekanntmachung über die Sprechfunkverfahren</i>, NfL 1-1127-17, DFS, Langen (Hessen) Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg
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Air Traffic Control Procedures and Implications			
Module-No./ Code	ATM 44		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Air Traffic Control Procedures and Implications		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this course, students shall be able to • (ATLA) recap basic knowledge of National Rules and Regulations in regard of aviation in Germany mainly for the Surveillance environment • (ATLA) demonstrate knowledge of Air Traffic Management Rules and Regulations mainly for the Surveillance environment • (ATLA) demonstrate knowledge of International Air Law mainly for the Surveillance environment • (RTF) explain the use of communication systems in aviation mainly for the Surveillance environment • (MET/NAV) explain the parameters in regard of altimetry and the atmosphere mainly for the Surveillance environment • (ACFT) explain the differences between aircraft drives and the interaction of forces on aircraft mainly for the Surveillance environment • (NAV) explain the different navigation methods in aviation • (NAV) apply basic calculation methods on the basis of the different metering systems in aviation • (ATLA) describe the basic principles of air traffic management procedures for the Surveillance Environment • (EQPS) explain the basic working principles of equipment that is in general use in ATC and appreciate how this equipment aids the controller in providing safe and efficient Air Traffic Service in the Surveillance environment.		
Syllabus plan	Aspects related to Surveillance environment: • National Rules and Regulations in regard of aviation in Germany • Air Traffic Management Rules and Regulations • International Air Law • communication systems in aviation • altimetry and the atmosphere • aircraft physics • navigation methods in aviation • calculation methods in aviation • principles of air traffic management procedures • equipment in use in ATC		
Semester of studies	4 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	7		
Total workload	210 h	Contact time	n/a

		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 42, ATM 43		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Electronic Exam Passmark: 75%		
Duration of examination	180 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	4,12%		
Teaching and learning methods	Lectures, learning programs, interactive lessons		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	• Use of Electronic Learning Programs (e.g. eSeeAviaion, ROSE) • Simulation Exercises with clear correlation to the previously taught theory lesson		
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2007): <i>Radio Telephony</i>. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2018): <i>Location Indicators</i>. ICAO Doc. 7910, 167. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2017): <i>Aircraft Type Designators</i>. ICAO Doc. 8643, 45. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2017): <i>Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services</i>. ICAO Doc. 8585, 182. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2005): <i>Rules of the Air</i>. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Deutsche Flugsicherung (Hrsg.) (2017): <i>Bekanntmachung über die Sprechfunkverfahren</i>, NfL 1-1127-17, DFS, Langen (Hessen)		

	Bundesministerium für Justiz und für Verbraucherschutz (Hrsg): <i>Luftverkehrsgesetz</i>, Version 20.07.2017, Deutschland, Berlin Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung techni- scher Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Sprin- ger-Verlag, Heidelberg
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Surveillance Procedures			
Module-No./ Code	ATM 45		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Surveillance Procedures		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this course, students shall be able to (SUR SIM) describe the basic principles of air traffic management and apply basic operational procedures in a Surveillance environment.		
Syllabus plan	- principles of air traffic management in a Surveillance environment - basic operational procedures in a Surveillance environment		
Semester of studies	4 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	4		
Total workload	120 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 44		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Practical Test (Simulator) 13 Performance criteria. None is accepted to be marked with "partly achieved"		
Duration of examination	45 min. - 60min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	2,35%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, simulator lessons		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Simulator exercise that shall prove, that the student is able to combine all learned procedures in an examination event.		
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal International Civil Aviation Organisation (Hrsg.) (2007): <i>Radio Telephony</i>. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal		

	International Civil Aviation Organisation (Hrsg.) (2005): <i>Rules of the Air</i>. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Deutsche Flugsicherung (Hrsg.) (2017): <i>Bekanntmachung über die Sprechfunkverfahren</i>, NfL 1-1127-17, DFS, Langen (Hessen) Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg
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Airspace and Basic Operational Procedures			
Module-No./ Code	ATM 50		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Airspace and Basic Operational Procedures		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to • understand and apply the basic principles to provide air traffic services within the defined area of responsibility • apply basic control, planning techniques and operational procedures to traffic		
Syllabus plan	• Introduction to rating • Aviation Law • Air Traffic Management, in particular • Introduction to simulation area and procedures • Basic Control, Planning and Communication Procedures • Practical part task exercises • Meteorology • Navigation • Aircraft		
Semester of studies	5 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	4		
Total workload	120 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 43, ATM 45		
Module co-ordinator	Frank Kunder		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Electronic Exam Passmark: 75%		
Duration of examination	180 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	2,35%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, part task training		
Special characteristics of the module (e.g. online teaching and	Guest lecture from Airline pilot		

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg

Operational Procedures			
Module-No./ Code	ATM 51		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Operational Procedures		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to demonstrate the ability to manage air traffic in a manner that ensures safe, orderly and expeditious services and handle standard and light traffic situations. In addition the applicants • manage the light workload and provide air traffic services within the defined area of responsibility • apply standard control, planning techniques and operational procedures to traffic		
Syllabus plan	• Air Traffic Management, in particular • Simulation area and procedures • Control, Planning and Communication Procedures • Practical exercises and Simulations • Navigation • Professional Environment • Abnormal and Emergency Situations		
Semester of studies	5 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	6		
Total workload	180 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 43, ATM 45, ATM 50		
Module co-ordinator	Frank Kunder		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Electronic Exam Passmark: 75%		
Duration of examination	180 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	3,53%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, part task training and simulation		
Special characteristics of the module (e.g. online teaching and	Visit to an Air Traffic Control unit		

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg

Advanced Operational Procedures			
Module-No./ Code	ATM 52		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Advanced Operational Procedures		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to demonstrate the ability to manage air traffic in a manner that ensures safe, orderly and expeditious services and handle standard and medium complex traffic situations. In addition the applicants • manage the medium workload and provide air traffic services within the defined area of responsibility • apply advanced control, planning techniques and operational procedures to traffic		
Syllabus plan	• Air Traffic Management, in particular • Simulation area and procedures • Advanced Control, Planning and Communication Procedures • Practical exercises and Simulations • Human Factors • Equipment and Systems • Professional Environment		
Semester of studies	5 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	6		
Total workload	180 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 43, ATM 45, ATM 50, ATM 51		
Module co-ordinator	Frank Kunder		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Practical Test (Simulator) Passmark: 75%		
Duration of examination	60 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	3,53%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, simulator lessons		
Special characteristics of the module (e.g. online teaching and	Simulator exercises		

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): <i>Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery</i>, DFS, Langen (Hessen) Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg

Consolidation of Operational Procedures and MO-ATS (Manual of Operations Air Traffic Services)			
Module-No./ Code	ATM 53		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Consolidation of Operational Procedures and MO-ATS (Manual of Operations Air Traffic Services)		
Trained competencies	Factual and procedural knowledge, diagnostic information gathering, analytical and conceptual thinking		
Intended learning outcomes of the module	On successful completion of this module, students shall be able to demonstrate the ability to manage air traffic in a manner that ensures safe, orderly and expeditious services and handle complex and dense traffic situations. In addition the applicants • manage the high workload and provide air traffic services within the defined area of responsibility • apply control, planning techniques and operational procedures to traffic • show the behaviour required for safe operation within air traffic control service		
Syllabus plan	• Air Traffic Management, in particular • Simulation area and procedures • Control, Planning and Communication Procedures • Practical exercises and Simulations • Abnormal and Emergency Situations		
Semester of studies	5 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	6		
Total workload	180 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 43, ATM 45, ATM 50, ATM 51, ATM 52		
Module co-ordinator	Frank Kunder		
Module lecturer(s)	DFS academy instructors from following departments: AK/A, AK/G		
Instruction language	English/German		
Examination type / requirements for assigning credit points	Practical Test (Simulator) Passmark: 75%		
Duration of examination	60 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	3,53%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, simulator lessons		

Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Simulator exercises
Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal DFS Deutsche Flugsicherung GmbH (Hrsg.) (2018): Manual of Operations Air Traffic Services, MO-ATS, 15th supplementary delivery, DFS, Langen (Hessen) Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg

On the Job Training (OJT)			
Module-No./ Code	ATM 60		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	ATM 61 Pre-OJT ATM 62 OJT		
Trained competencies	Professional Skills Methodological Competence Social Skills Self-competence		
Intended learning outcomes of the module	On completion of this module, students shall be able to demonstrate the ability to manage live air traffic under supervision of a licensed on-the-job training instructor (OJTI) in a manner that ensures safe, orderly and expeditious services.		
Syllabus plan	Air Traffic Management, in particular • Airspace and Procedures in related sectors • Control, Planning and Communication Procedures in related sectors • Simulator exercises in related sectors • Practical work under supervision of a licensed OJTI • Human Factors • Teamwork		
Semester of studies	6 th semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Every semester		
Amount of assigned credit points	20		
Total workload	600 h	Contact time	n/a
		Self-study time	n/a
Module type (compulsory, optional, etc.)	Compulsory		
Applicability of the module for other courses of study	None		
Prerequisites	ATM 43, ATM 45, ATM 50, ATM 51, ATM 52, ATM 53		
Module co-ordinator	Sabine Räk		
Module lecturer(s)	DFS instructors (OJTI's) at local units		
Instruction language	English/German		
Examination type / requirements for assigning credit points	None		
Duration of examination	n/a		
Examination graded / not graded	Not graded		
Weighting of the mark within the cumulative grade	0,00%		
Teaching and learning methods	Lectures, learning programs, interactive lessons, simulator lessons, practical training, mentoring and supervision		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Simulator exercises Live traffic handling		

Literature (compulsory reading / additional recommended literature)	International Civil Aviation Organisation (Hrsg.) (2016): <i>Procedures for Air Navigation Services – Air Traffic Management</i>. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal Europäische Union (Hrsg.) (2015): <i>Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Fluglotsen</i>. EU, Brüssel. Mensen, H. (2014): <i>Moderne Flugsicherung</i>. 4. Auflage. Springer-Verlag, Heidelberg DFS (Hrsg.) (2018): <i>Manual of Operations – Air Traffic Services (MO-ATS)</i>. 15th supplementary delivery. DFS, Langen
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