

# Modulhandbuch

## Air Traffic Management – dual (B.Sc.)

Stand: 04.03.2024

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# I. Allgemeiner Teil

## **Ein Hinweis vorab:**

*Aus Gründen der besseren Lesbarkeit wird auf die gleichzeitige Verwendung männlicher, weiblicher und diverser Geschlechtsformen im Text verzichtet. Sämtliche Personenbezeichnungen gelten gleichermaßen für alle Geschlechter.*

## **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. 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 Fluglotseausbildung 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 hineinzudenken 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 durchgängige englische Unterrichtssprache sind die Lehrveranstaltungen grundsätzlich stärker als deutschsprachige Lehrveranstaltungen für Studierende aus dem europäischen und außereuropäischen Ausland attraktiv. Die Lehrveranstaltungen werden zu-

dem 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 30 Sustainable Aviation: 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 Organisational 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 auch der Erwerb von Kenntnissen und Fertigkeiten in verschiedenen Kommunikations-, Kooperations- und Konfliktsituationen sowie die Bereitschaft, sich auf diese Situationen einzulassen.

## **2. Zulassungsvoraussetzungen**

### **§ 4 Zugangsvoraussetzungen, Studienbeginn (zu § 6 RPO)**

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

Die Einschreibung in den Bachelorstudiengang Air Traffic Management – dual, setzt einen wirksamen abgeschlossenen Studien- und Ausbildungsvertrag zwischen der DFS Deutsche Flugsicherung GmbH und der einzuschreibenden bzw. eingeschriebenen Person voraus.

## **3. Modularisierte Studiengänge - Modulprüfungen**

Der Bachelorstudiengang »Air Traffic Management – dual« 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.

## **4. 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 – dual« müssen insgesamt 180 Leistungspunkte erworben werden. Nähere Bestimmungen zur Vergabe von Leistungspunkten finden sich im fachspezifischen Teil des Modulhandbuchs.

## II. Fachspezifischer Teil

### 1. Study Plan

Modulbezeichnung	Nr.	Lehrveranstaltungen	Art	Sem	Prüfung	Prüfungsform (Dauer)	Gesamt		Regelsemester LP (SWS)					
							LP	SWS	1.	2.	3.	4.	5.	6.
<b>Basismodule 98 LP</b>														
<b>Introduction to Business Administration</b>	ATM 10	V (4 SWS)	P	1	PL	K (120 min)	5	4	5 (4)					
<b>Introduction to Economics</b>	ATM 11	V (4 SWS)	P	1	PL	K (120 min)	5	4	5 (4)					
<b>Flight Operations</b>	ATM 12	V (4 SWS)	P	1	PL	K (120 min)	5	4	5 (4)					
<b>Introduction to Aviation Management</b>	ATM 13	V (4 SWS)	P	1	PL	K (120 min)	5	4	5 (4)					
<b>Business English</b>	ATM 14	V (4 SWS)	P	1	PL	K (120 min) + Präs. (25–30 min)	5	4	5 (4)					
<b>Analytical Methods</b>	ATM 15		P	1	PL	K (120 min)	5	4	5 (4)					
<i>Mathematics</i>	ATM 151	V (2 SWS)	P											
<i>Statistics</i>	ATM 152	V (2 SWS)	P											
<b>Research Methods, Presentation and Soft Skills</b>	ATM 20		P	2	MTP	HA Präs. (20–30 min)	4	4		4 (4)				
<i>Research Methods</i>	ATM 201	V (2 SWS)	P											
<i>Presentation and Soft Skills</i>	ATM 202	V (2 SWS)	P											
<b>Financial Accounting and Reporting</b>	ATM 21	V (4 SWS)	P	2	PL	K (120 min)	5	4		5 (4)				
<b>Marketing and Sales Management</b>	ATM 22	V (4 SWS)	P	2	PL	K (120 min)	5	4		5 (4)				
<b>Air Transportation Policy and Law</b>	ATM 23	V (4 SWS)	P	2	PL	K (120 min)	5	4		5 (4)				
<b>Introduction to Air Traffic Management</b>	ATM 24	V (4 SWS)	P	2	PL	K (120 min)	5	4		5 (4)				
<b>Aviation Analytics</b>	ATM 25	V (4 SWS)	P	2	PL	K (120 min) o. PA	6	4		6 (4)				
<b>Sustainable Aviation</b>	ATM 30	V (4 SWS)	P	3	PL	K (120 min)	5	4			5 (4)			
<b>Seminar Aviation Management 1<sup>2</sup></b>	ATM 31	S (4 SWS)	P	3	PL	HA + Präs. (20–30 min)	5	4			5 (4)			
<b>Human Resources Management and Organisational Development</b>	ATM 32	V (3 SWS)	P	3	PL	K (90 min)	5	3			5 (3)			
<b>Airport Management</b>	ATM 33	V (3 SWS)	P	3	PL	K (90 min)	5	3			5 (3)			
<b>Network Management and Scheduling</b>	ATM 34	V (3 SWS)	P	3	PL	K (90 min) o. PA	5	3			5 (3)			



Modulbezeichnung	Nr.	Lehrveranstaltungen	Art	Sem	Prüfung	Prüfungsform (Dauer)	Gesamt		Regelsemester LP (SWS)						
							LP	SWS	1.	2.	3.	4.	5.	6.	
Airline Business Models and Strategies	ATM 35	V (4 SWS)	P	3	PL	K (120 min) o. PA	5	4			5 (4)				
Seminar Aviation Management 2 <sup>2</sup>	ATM 44	S (4 SWS)	P	4	PL	HA + Präs. (25 min) + PR	8	4				8 (4)			
<b>Bachelorarbeit 10 LP</b>															
Bachelor's thesis	ATM 61		P	6	PL		10	0						10 (0)	
<b>Fluglotsenausbildung – Initial Training (IT) 52 LP<sup>1</sup></b>															
Aeronautical English Oral <sup>1</sup>	ATM 40	V	P	4	PL	mP (20 min)	3	n/a				3			
Legal Bases and Aeronautical Basics <sup>1</sup>	ATM 41	V	P	4	PL	EK (180 min)	7	n/a				7			
Tower Operations and Aeronautical Basics <sup>1</sup>	ATM 42	V	P	4	PL	EK (180 min)	7	n/a				7			
Tower Procedures <sup>1</sup>	ATM 43	Ü	P	4	PL	PT (45–60 min)	5	n/a				5			
Airspace and Basic Operational Procedures <sup>1</sup>	ATM 50	V	P	5	PL	EK (180 min)	4	n/a					4		
Operational Procedures <sup>1</sup>	ATM 51	V	P	5	PL	EK (180 min)	6	n/a					6		
Advanced Operational Procedures <sup>1</sup>	ATM 52	Ü	P	5	PL	PT (60 min)	6	n/a					6		
Consolidation of Operational Procedures and MO-ATS (Manual of Operations Air Traffic Services) <sup>1</sup>	ATM 53	Ü	P	5	PL	PT (60 min)	6	n/a					6		
Air Traffic Control Procedures and Implications <sup>1</sup>	ATM 54	V	P	5	PL	EK (180 min)	6	n/a					6		
Surveillance Procedures <sup>1</sup>	ATM 55	Ü	P	5	PL	PT (45–60 min)	2	n/a					2		
<b>Fluglotsenausbildung – Unit Training (UT) 20 LP<sup>1</sup></b>															
On the Job Training (OJT) <sup>1</sup>	ATM 60		P	6			20								
Pre-OJT	ATM 601	Pr	P		SL			n/a							5
OJT	ATM 602	Pr	P		SL			n/a							15
<b>Gesamtsumme</b>							<b>180</b>	<b>73</b>	<b>30 (24)</b>	<b>30 (24)</b>	<b>30 (21)</b>	<b>30 (4)</b>	<b>30 (0)</b>	<b>30 (0)</b>	

**Legende:**

P = Pflichtmodul

Sem = vorgesehene Semester

SWS = Semesterwochenstunde,

LP = Leistungspunkte

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

Prüfungen: PL=Prüfungsleistung, SL=Studienleistung, MTP = Moduleilprüfung, HA = Hausarbeit, K = Klausur, mP = mündliche Prüfung, PA=Projektarbeit; Präs. = Präsentation, PR = Peer-Review, EK = E-Klausur, PT = Practical Test (Simulator)



Nach § 14 Abs. 7 der RPO legt der Studiengang Air Traffic Management – dual 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 – dual 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.

<sup>1</sup> Kennzeichnung von Modulen beim Praxispartner

<sup>2</sup> Eine Teilnahmepflicht an 80% der Lehrveranstaltungen gemäß § 26 (2) Nr. 7 HochSchG ist in diesem Modul Voraussetzung zur Lernzielerreichung und Erbringung der Prüfungsleistung. Näheres ist der Modulbeschreibung zu entnehmen.

## 2. Module Descriptions

<b>Introduction to Business Administration</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• recognise and articulate fundamental assumptions, ideas and concepts of starting and running a business with regard to following topics:               <ol style="list-style-type: none"> <li>1. External Environment and stakeholders</li> <li>2. Organisational Structure and Planning</li> <li>3. Leadership and Management</li> <li>4. Growth and Globalisation</li> </ol> </li> <li>• draw from theories and principles to help solve managerial problems.</li> </ul>		
Syllabus plan	<p>Fundamentals of management and organisations within contemporary society. Introduction to functional areas, management processes, themes and issues within management:</p> <ul style="list-style-type: none"> <li>• Business Management               <ul style="list-style-type: none"> <li>○ Nature of business activity</li> <li>○ Vision/Mission of companies and Stakeholders</li> <li>○ Leadership and Motivation</li> <li>○ Growth and Globalisation</li> </ul> </li> <li>• Human Resources</li> <li>• Marketing</li> <li>• Accounting</li> </ul>		
Semester of studies	1 <sup>st</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 – dual (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)	<ul style="list-style-type: none"> <li>• Wild, J. / Wild K. International Business, 2024</li> <li>• Stimpson, P./Smith, A.: Business and Management, 2012</li> </ul> <p>Literature recommendations are adapted and customised by the lecturer.</p>

<b>Introduction to Economics</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• describe fundamental assumptions, ideas and concepts of economics,</li> <li>• use economic theories and principles for solving managerial problems,</li> <li>• identify the effect of different market structures on firm's decision making,</li> <li>• explain the determinants of macroeconomic developments,</li> <li>• demonstrate their economic knowledge with respect to decisions concerning the tourism and transport industry.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Introduction <ul style="list-style-type: none"> <li>○ Basic questions and concepts</li> <li>○ Economic modelling</li> <li>○ Economic systems and market economy</li> </ul> </li> <li>• Microeconomics <ul style="list-style-type: none"> <li>○ Households</li> <li>○ Firms</li> <li>○ Markets</li> </ul> </li> <li>• Macroeconomics <ul style="list-style-type: none"> <li>○ National Accounting</li> <li>○ Macroeconomic models</li> </ul> </li> </ul>		
Semester of studies	1 <sup>st</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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	Tourism and Travel Management (B.A.) Tourism and Travel Management – dual (B.A.) Aviation Management and Piloting – dual (B.Sc.) Aviation Management (B.A.) Aviation Management – dual (B.A.)		
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)	<ul style="list-style-type: none"> <li>• Principles of Economics, N. Gregory Mankiw, most recent edition</li> <li>• Macroeconomics, N. Gregory Mankiw, most recent edition</li> <li>• Intermediate Microeconomics. A Modern Approach, Hal R. Varian, most recent edition</li> </ul>

<b>Flight Operations</b>			
Modul-Nr./ Code	ATM 12		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Flight Operations		
Trained competencies	Professional Skills		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• explain the fundamentals of flight and aircraft performance,</li> <li>• describe basics of aircraft systems and performance,</li> <li>• understand the dependency of flight operations on weather phenomena,</li> <li>• differentiate between operations regulations and understand their impact,</li> <li>• discuss influencing factors on decision making on the day of operations.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Flight Principles</li> <li>• Aircraft Performance</li> <li>• Aircraft Systems</li> <li>• Navigation</li> <li>• Meteorology</li> <li>• Flight Operations Regulations</li> <li>• Flight Economics</li> <li>• Flight Dispatch and Operations Control</li> </ul>		
Semester of studies	1 <sup>st</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer semester		
Amount of assigned credit points	5		
Total workload	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.) Aviation Management – dual (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	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)	<ul style="list-style-type: none"><li>• The Global Airline Industry, Belobaba/Odoni/Barnhart, 2nd edition (2015)</li><li>• Pilot's Handbook of Aeronautical Knowledge, FAA, US Department of Transportation.</li><li>• Airline Operations – A Practical Guide, Bruce/Gao/King (2018).</li><li>• EASA and FAA regulations</li></ul>



<b>Introduction to Aviation Management</b>			
Modul-Nr./ Code	ATM 13		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Introduction to Aviation Management		
Trained competencies	Professional Skills Self-competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• recognise and interpret a range of important practical aspects of the aviation industry,</li> <li>• 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,</li> <li>• 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,</li> <li>• identify competing objectives and constraints in the context of the aviation industry,</li> <li>• effectively communicate management ideas and practices in English.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Basics of commercial aviation: Key players, introduction to air law, deregulation and liberalisation, demand development</li> <li>• Airline management (focus on passenger airlines): Basic terms, traffic figures, key figures of Lufthansa, competitive strategies</li> <li>• Airport management: Basic terms, traffic figures, aeronautical and non-aeronautical business</li> <li>• Air cargo management: Basic terms, differences to passenger business</li> </ul>		
Semester of studies	1 <sup>st</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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.) Aviation Management – dual (B.A.)		
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)

<b>Business English</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students are expected to be able to</p> <ul style="list-style-type: none"> <li>• recall, explain, interpret, and paraphrase advanced business English vocabulary, including, but not limited to, aviation-related terminology,</li> <li>• identify, and differentiate between, text types that are commonly used in business communication, recognizing their various extent of language complexity,</li> <li>• apply various text/speech production strategies (in particular: generalizing vs. specifying), considering different linguistic registers/styles and the particular purpose of a text,</li> <li>• communicate effectively and adequately in a business setting (considering the particular requirements of different addressee/s),</li> <li>• 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).</li> </ul>		
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 <sup>st</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 – dual (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) (25-30 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: texts and videos covering current developments in the aviation industry.
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)	<ul style="list-style-type: none"> <li>• Business Proficiency, Wirtschaftsentgisch für Hochschule und Beruf, Klett, Neuauflage 2017</li> <li>• English for Financial Institutions, Bibliothèque Nationale de Luxembourg 2020</li> <li>• Vocabulary lists and exercises (provided by lecturer)</li> <li>• Recommended (daily) reading tips: <a href="https://www.bloomberg.com/businessweek">https://www.bloomberg.com/businessweek</a>; <a href="https://www.ft.com/">https://www.ft.com/</a> (Financial Times); <a href="https://hbr.org/">https://hbr.org/</a> (Harvard Business Review); <a href="http://www.aviationnews-online.com/">http://www.aviationnews-online.com/</a>; <a href="https://www.aerotelegraph.com/en/">https://www.aerotelegraph.com/en/</a>; <a href="https://simpleflying.com/category/aviation-news/">https://simpleflying.com/category/aviation-news/</a>; <a href="https://www.washingtonpost.com/business/">https://www.washingtonpost.com/business/</a>; <a href="https://www.youtube.com/c/SimpleFlyingNews">https://www.youtube.com/c/SimpleFlyingNews</a> (listening skills)</li> </ul>

<b>Analytical Methods</b>			
Modul-Nr./ 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 Self-competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <p>ATM 151:</p> <ul style="list-style-type: none"> <li>• understand and apply fundamental mathematical concepts such as algebra and calculus,</li> <li>• apply different solution techniques for equation systems, optimization problems, also including constraints,</li> <li>• convert basic problems of financial economics into mathematical formulations and solve them, develop critical, structured, analytical thinking skills.</li> </ul> <p>ATM 152:</p> <ul style="list-style-type: none"> <li>• use basic methods of descriptive statistics,</li> <li>• apply frequently used probability distributions to statistical problems,</li> <li>• analyse economic problems using appropriate statistical methods.</li> </ul>		
Syllabus plan	<p>ATM 151: Mathematical methods with applications to business and economics. Topics include functions, graphs, properties of functions, equations and identities, slopes and intercepts, derivatives, optimisation, 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.</p> <p>ATM 152: Introduction to basic statistical concepts. Types of variables. Data presentation. Data summarisation. 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.</p>		
Semester of studies	1 <sup>st</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 – dual (B.A.)
Prerequisites	None
Module co-ordinator	Prof. Dr. Matthias Viehmann
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 125: 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)	<p>ATM 151:</p> <ul style="list-style-type: none"> <li>• Essential Mathematics for Economic Analysis, Knut Sydsaeter, Peter Hammond, Arne Strom, Andres Carvajal, 6th edition (2022).</li> </ul> <p>ATM 152:</p> <ul style="list-style-type: none"> <li>• The Practice of Business Statistics for Business and Economics, George P. McCabe, Bruce A. Craig, Layth C. Alan, 5th edition (2020)</li> </ul>

<b>Research Methods, Presentation and Soft Skills</b>			
Modul-Nr./ Code	ATM 20		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	ATM 201 Research Methods ATM 202 Presentation and Soft Skills		
Trained competencies	Methodological Competence Social Skills Self-competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <p>ATM 201</p> <ul style="list-style-type: none"> <li>• formulate research questions,</li> <li>• review and analyse research publications,</li> <li>• adequately reference literature and demonstrate a deep understanding of good scientific practice,</li> <li>• explain and use different research techniques,</li> <li>• write scientific papers.</li> </ul> <p>ATM 202</p> <ul style="list-style-type: none"> <li>• participate in a constructive and productive way in different situations of communication (conversations, discussions, presentations),</li> <li>• provide and accept productive criticism,</li> <li>• work as group in a positive and effective way,</li> <li>• prepare and deliver presentations to communicate project results.</li> </ul>		
Syllabus plan	<p>ATM 201: Introduction to the art and science of solving research problems and making students better users of research. Key elements of preparation, organisation and delivery of a paper and presentation. Critically reviewing literature and data. Introduction of a style manual for the preparation of a research proposal. Effective communication of research results in an academic context. Preparing, structuring and delivering presentations.</p> <p>ATM 202: Training in communication, personality, delivering presentations including the preparation of the presentation, time management, self-management</p>		
Semester of studies	2 <sup>nd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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	<p>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.</p> <p>Aviation Management (B.A.) Aviation Management – dual (B.A.)</p>
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	<p>ATM 201: Preparation of research paper</p> <p>ATM 202: Team work with subsequent team presentation</p>
Duration of examination	<p>ATM 201: 9-11 pages</p> <p>ATM 202: 20-30 minutes</p>
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	2,35%
Teaching and learning methods	Lectures, script, individual paper preparation, class exercises, discussions
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	<p>ATM 201:</p> <ul style="list-style-type: none"> <li>• Research Methods for Business Students, Mark Saunders, Philip Lewis, Adrian Thornhill, 8th edition (2019)</li> </ul> <p>ATM 202:</p> <ul style="list-style-type: none"> <li>• Personality Development and Soft Skills, B. Mitra (2012)</li> <li>• Soft Skills: Know Yourself &amp; Know the World, K. Alex, (2010)</li> </ul>

<b>Financial Accounting and Reporting</b>			
Modul-Nr./ Code	ATM 21		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Financial Accounting and Reporting		
Trained competencies	Methodological Competence		
Intended learning outcomes of the module	<p>Upon successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• define and describe the elements of financial information to be provided periodically by companies according to International Accounting Standards set by the International Accounting Standards Board,</li> <li>• explain the basic and underlying accounting standards set by the International Accounting Standards Board,</li> <li>• demonstrate and interpret the link and basic differences between single elements of financial information, especially between statement of financial position, statement of financial performance and cash flow statement,</li> <li>• examine business issues and determine the respective accounting treatment,</li> <li>• judge case studies with several business issues by reference to the accounting examples presented in class and to select the respective required accounting treatment,</li> <li>• develop the required accounting treatment for business issues presented, including developing the statement of financial position and the income statement for case studies provided.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Reasons for and the meaning of Accounting &amp; Financial Reporting</li> <li>• The IFRS conceptual framework for financial reporting</li> <li>• Accounting transactions and journal entries</li> <li>• Accounting for Capital Market communication</li> <li>• General requirements for recognition and valuation</li> <li>• Elements of financial reporting</li> </ul>		
Semester of studies	2 <sup>nd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 – dual (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)	<p>For basic accounting:</p> <ul style="list-style-type: none"> <li>• Weygandt, Jerry/ Kimmel, Paul/ Kieso, Donald (2018): Financial Reporting with International Financial Reporting Standards, 4th edition, John Wiley &amp; Sons, Hoboken.</li> </ul> <p>For advanced concepts:</p> <ul style="list-style-type: none"> <li>• Douppnik, Timothy/ Finn, Mark/ Gotti, Giorgio/ Perera, H. (2019): ISE International Accounting, 5<sup>th</sup> edition, McGraw - Hill Higher Education, New York.</li> </ul>

<b>Marketing and Sales Management</b>	
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• explain the necessity, changing role and probable future direction of marketing in a market economy,</li> <li>• describe the fundamental idea behind marketing and the marketer's role within a firm as "the customer's advocate",</li> <li>• differentiate and evaluate alternative conceptions of marketing,</li> <li>• analyse B2C and the related consumer buying behaviour as well as B2B markets and the related institutional buying behaviour,</li> <li>• describe and discuss fundamental marketing techniques like market segmentation, target marketing, and positioning,</li> <li>• explain, distinguish, and discuss basic elements of the marketing mix and the related management concepts concerning the following policies: branding, product and product range, pricing, sales and distribution, and communication,</li> <li>• apply basic marketing techniques like segmentation, target marketing, and mix policies to case studies and empirical examples presented in the lectures.</li> </ul>
Syllabus plan	<p>A. Foundations of Marketing</p> <ul style="list-style-type: none"> <li>• Defining Marketing</li> <li>• Historical Preconditions of Marketing</li> <li>• Different Aspects of the Marketing Concept</li> <li>• Foundations of Services Marketing</li> </ul> <p>B. The Marketing Environment</p> <ul style="list-style-type: none"> <li>• Microenvironment</li> <li>• Macroenvironment</li> </ul> <p>C. Consumer Behaviour and Market Segmentation</p> <ul style="list-style-type: none"> <li>• Current Shifts in Consumer Behaviour</li> <li>• Conceptual Framework of Consumer Behaviour</li> <li>• Buying Decision Process</li> <li>• Market Segmentation and Segmentation Variables</li> <li>• Market Targeting and Positioning</li> </ul> <p>D. Marketing Mix Management: Basic Elements of</p> <ul style="list-style-type: none"> <li>• Branding Policy</li> <li>• Product and Product Range Policy</li> <li>• Price Policy</li> <li>• Sales and Distribution Policy</li> <li>• Communication Policy</li> </ul>
Semester of studies	2 <sup>nd</sup> semester
Module duration	1 semester

Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 – dual (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)	<ul style="list-style-type: none"> <li>• Kotler &amp; Keller: Marketing Management, current edition</li> <li>• Kotler &amp; Bowen &amp; Make: Marketing for Hospitality and Tourism, current edition</li> </ul>		

<b>Air Transportation Policy and Law</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• define basic motivation, logic of regulation and deregulation in international air transport and airports (in the EU),</li> <li>• define underlying terms and conditions as well as concrete areas and tools of regulation in international air traffic,</li> <li>• repeat and classify institutions and authorities on national and supra national level that are responsible for transport policy,</li> <li>• memorise and describe other relevant international organisations in the aviation industry,</li> <li>• analyse and evaluate recent developments pertaining to consolidation and changing market-environments due to new business models and increasing competition.</li> </ul>		
Syllabus plan	<p>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.</p> <p>The course comprises the theoretical basis of the most important air transport related laws. It also covers related areas of regulation such as labour law, corporate law and insolvency law. Case studies ensure the practical application of the most relevant articles within the laws.</p> <p>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.</p> <p>Finally the students are confronted with consolidation trends and novel constellations in the international aviation markets.</p>		
Semester of studies	2 <sup>nd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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.): Wahlpflichtmodule		

	Aviation Management (B.A.) Aviation Management – dual (B.A.)
Prerequisites	None
Module co-ordinator	Prof. Dr. Tobias Ehlen
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)	<ul style="list-style-type: none"> <li>• Scott, Benjamin and Trimarchi, Andrea, Fundamentals of International Aviation Law and Policy (2019)</li> <li>• Bartsch, International Aviation Law: A Practical Guide (2020)</li> </ul>



<b>Introduction to Air Traffic Management</b>			
Modul-Nr./ Code	ATM 24		
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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• describe different areas in ATM;</li> <li>• identify different challenges and success factors of ATM,</li> <li>• state basic knowledge of execution of flights in airspace, separation and segregation, tasks of air traffic services, safety methods,</li> <li>• describe connection between aircraft and air traffic management service in present aviation.</li> </ul>		
Syllabus plan	<p>Fundamentals of Air Traffic Management and Air Navigation Services within the aviation system. Introduction to functional areas, processes, themes and issues:</p> <ul style="list-style-type: none"> <li>• History of Air Traffic Management (ATM)</li> <li>• International bodies and organisations: ICAO, Eurocontrol, EASA, Canso</li> <li>• The importance of safety management in ATC</li> <li>• ATM concepts and terminology</li> <li>• Airspace structures</li> <li>• Technical equipment in ATC</li> <li>• Ground-ground and air-ground communications</li> <li>• Ground- and Space based navigation systems</li> <li>• Primary and secondary surveillance</li> </ul>		
Semester of studies	2 <sup>nd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 and Piloting – dual (B.Sc.): Wahlpflichtmodule Aviation Management (B.A.) Aviation Management – dual (B.A.)		
Prerequisites	Completion of ATM 13 Introduction to Aviation Management is recommended.		
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: <ul style="list-style-type: none"> <li>• DFS Campus Langen (LIZ, Academy, Research Center)</li> </ul>
Literature (compulsory reading / additional recommended literature)	<ul style="list-style-type: none"> <li>• Nolan, Michael S. (2010) Fundamentals of Air Traffic Control, 5 ed., Delmar</li> <li>• Marina Efthymiou (ed.) (2023) Air Traffic Management Principles, Performance, Markets</li> <li>• Margaret Arblaster (2018) Air traffic management : Economics, regulation and governance</li> </ul> <p>Literature recommendations are adapted and customised by the lecturer</p>

<b>Aviation Analytics</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• explain important data analytics-related terms and concepts such as the difference between data, information and knowledge, big data, business intelligence etc.,</li> <li>• design, optimise and implement databases and access data (via SQL),</li> <li>• collect data from external sources, validate the data and import them into local systems,</li> <li>• discuss the importance of high data quality in organisational contexts and how this can be achieved / assured,</li> <li>• use business analytics techniques, e.g. to read, summarise and visualise data to support (better) business decisions,</li> <li>• select proper techniques for visualisation of data and arrange them properly in dashboards to support decision processes using state of the art analytics software solutions,</li> <li>• select proper KPIs to answer certain business questions, gather data to calculate and interpret different KPIs relevant in the aviation industry,</li> <li>• apply regression and advanced regression models for estimations and interpret results including limitations.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Introduction to Business Analytics</li> <li>• Fundamental data analytics concepts and frameworks</li> <li>• Databases and information management</li> <li>• Different types of data and variables</li> <li>• Collecting, standardising and optimising data</li> <li>• Data sources in the Aviation Industry</li> <li>• KPIs in the aviation industry</li> <li>• Descriptive Analytics and Dashboard Design including summary measures and visualisations</li> <li>• Predictive Analytics: Regression and Advanced Regression Models</li> </ul>		
Semester of studies	2 <sup>nd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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.) Aviation Management – dual (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%) or project work
Duration of examination	120 min (final written / computer-based examination) or 10 pages (project work)
Examination graded / not graded	graded
Weighting of the mark within the cumulative grade	3,53%
Teaching and learning methods	Lectures and tutorials, discussions, reading, homework assignments
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Guest lectures, online sessions for collaborative data analysis in distributed settings
Literature (compulsory reading / additional recommended literature)	<ul style="list-style-type: none"> <li>• Jaggia, Kelly, Lertwachara, Chen (2021): Business Analytics – Communicating with Numbers, McGraw-Hill Education, New York, NY (ISBN 978-1-260-57601-6)</li> <li>• Few (2013): Information dashboard design: displaying data for at-a-glance monitoring, Analytics Press, Burlingame, CA (ISBN 978-1-938377-00-6)</li> <li>• Hillier and Lieberman (2021): Introduction to Operations Research, McGraw-Hill Education, New York, NY (ISBN 978-1-259-87299-0)</li> <li>• Laudon and Laudon (2022): Management Information Systems, 17<sup>th</sup> edition, Pearson, Harlow (978-1-292-40328-1)</li> </ul>

<b>Sustainable Aviation</b>			
Modul-Nr./ Code	ATM 30		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Sustainable Aviation		
Trained competencies	Professional Skills Methodological Competence Self-competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• describe relevant economic, ecological and social issues in aviation,</li> <li>• identify the perspectives of the different stakeholders with respect to sustainability issues,</li> <li>• explain environmental impact by aviation and mitigation strategies,</li> <li>• discuss design and effects of policy instruments for safeguarding sustainability,</li> <li>• explain principles and instruments of sustainability,</li> <li>• use their knowledge to develop ideas for a sustainable air-line, airport, ANSP and service provider management.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Principles and definitions</li> <li>• Sustainability effects of air transport</li> <li>• Policy instruments for safeguarding sustainability <ul style="list-style-type: none"> <li>○ Standards, incentives, ETS, land use planning</li> </ul> </li> <li>• Environmental impact of aviation</li> <li>• Technical and operational mitigation strategies</li> <li>• Sustainability management <ul style="list-style-type: none"> <li>○ Airlines, airports, ANSPs, service providers</li> </ul> </li> </ul>		
Semester of studies	3 <sup>rd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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.) Aviation Management – dual (B.A.)		
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	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)	<ul style="list-style-type: none"> <li>• Fichert, F. / Forsyth, P. / Niemeier, H.-M. (eds.) (2020): Aviation and Climate Change. Economic Perspectives on Greenhouse Gas Reduction Policies, Abingdon / New York: Routledge.</li> <li>• Daley, B. (2010), Air Transport and the Environment, Farnham / Burlington.</li> <li>• Walls, J.L. / Wittmer, A. (eds.) Sustainable Aviation – A Management Perspective, St. Gallen, 2022</li> <li>• Sustainability reports of airlines, airports, air navigation service providers and industry organisations</li> </ul>

<b>Seminar Aviation Management 1</b>			
Modul-Nr./ Code	ATM 31		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Seminar Aviation Management 1		
Trained competencies	Professional Skills Methodological Competence Self-competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• execute independent scientific work on a topic in the area of aviation management,</li> <li>• use economic and / or socio-scientific methods in the context of aviation management,</li> <li>• organise a presentation of the results in a suitable form in front of the group,</li> <li>• organise subsequent discussion, and the ability to defend their opinions in a sound manner,</li> <li>• differentiate the essentials from insignificant information, and to consistently prepare them for thought-provoking and problem-solving suggestions,</li> <li>• appraise, argue and defend a stand on a specific issue from the area of aviation management.</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Working out a topic as a paper</li> <li>• Fundamentals of scientific work</li> <li>• Application of business methods (general management methods, marketing methods, etc.) on specific issues in aviation management</li> </ul>		
Semester of studies	3 <sup>rd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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.) Aviation Management – dual (B.A.)		
Prerequisites	None		
Module co-ordinator	Prof. Dr. Richard Klophaus		
Module lecturer(s)	various		
Instruction language	English		
Examination type / requirements for assigning credit points	Seminar paper (50%) and presentation (50%) and class attendance of at least 80%		
Duration of examination	Seminar paper (15p) and presentation (15 min + at least 5 min discussion)		
Examination graded / not graded	graded		
Weighting of the mark within the cumulative grade	2,94%		

Teaching and learning methods	Seminar with term paper and short presentation, moderated discussion, content additions by lecturer, work in groups, Talks with students on their seminar topics.
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	Allocation of topics and introductory session take place in the previous semester.
Literature (compulsory reading / additional recommended literature)	As the topics of the seminar change from semester to semester, the literature recommendations are adapted and customised.



<b>Human Resources Management and Organisational Development</b>			
Modul-Nr./ Code	ATM 32		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Human Resources Management and Organisational Development		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• understand fundamental terms, tools, challenges, tasks, techniques and concept in HRM, Leadership and ORG,</li> <li>• apply and develop approaches to such concepts to business-critical issues (e.g., in case studies),</li> <li>• analyse &amp; explain issues in enterprises in HRM and ORG (set-up, business processes &amp; Project M.).</li> </ul>		
Syllabus plan	<p>HRM: Theoretical and practical aspects of HRM in a global perspective. Practical application is studied using business cases and group exercises:</p> <ul style="list-style-type: none"> <li>• Current challenges and approaches</li> <li>• Spheres of activities</li> <li>• Actors in HRM</li> <li>• Talent Management</li> <li>• HRM Strategies</li> <li>• Fundamentals of workforce planning</li> <li>• Digital solutions and data protection (EUGDPR)</li> <li>• Selected HR processes: development and recruiting</li> <li>• Change Management</li> <li>• Leadership (skills, styles, concepts, ethics)</li> </ul> <p>ORG</p> <p>Integration of the individual into the organisation by studying the current and fundamental issues in organisation theory and organisational behaviour using case studies.</p> <ul style="list-style-type: none"> <li>• Elements of organisations</li> <li>• Organisational set-up; requirements on development</li> <li>• Process management, workflows, Business Process Reengineering, Lean Management</li> <li>• Project Management</li> <li>• Work organisation</li> </ul>		
Semester of studies	3 <sup>rd</sup> semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Winter/Summer 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 and Piloting – dual (B.Sc.): Wahlpflichtmodule Aviation Management (B.A.) Aviation Management – dual (B.A.)
Prerequisites	None
Module co-ordinator	Prof. Dr. Klaus Jäckel
Module lecturer(s)	Gero von Götz
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)	<ul style="list-style-type: none"> <li>• Essays (e.g. Greiner) and case studies (homework)</li> <li>• script</li> <li>• recommended additional readings are provided.</li> </ul>

<b>Airport Management</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• describe broad aspects of managing airports,</li> <li>• assess the environmental impact of airports,</li> <li>• understand the regulatory issues that influence airport management,</li> <li>• describe the airport industry structure, types of airports, competition between airports and name airport organisations,</li> <li>• analyse and gain detailed understanding of the commercial management of airports, their revenue and cost structure,</li> <li>• understand the planning parameters for airports, their runway capacity and terminal area airspace capacity, the terminal structure and the landside access,</li> <li>• determine the capacity of the various airport components,</li> <li>• understand the success factors in airport operations with particular focus on security and non-aviation business,</li> <li>• identify relevant business trends as well as innovations in digitisation and automation and their implications.</li> </ul>		
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 de-regulation of ground handling services within the EU.		
Semester of studies	3 <sup>rd</sup> semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Winter/Summer 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 and Piloting – dual (B.Sc.): Wahlpflichtmodule Aviation Management (B.A.) Aviation Management – dual (B.A.)		
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.)	This course can be complemented by special elective airport management seminars dealing in depth with issues of terminal and ramp management offered by airport executives.
Literature (compulsory reading / additional recommended literature)	<ul style="list-style-type: none"> <li>• Managing Airports: An International Perspective, Anne Graham, (latest edition)</li> <li>• Airport Planning &amp; Management, Alexander T. Wells, Seth B. Young, 5th edition (latest edition)</li> <li>• Antonin Kazda, Robert Caves: Airport Design and Operations (latest edition)</li> <li>• Richard de Neufville, Amedeo Odoni: Airports Systems (latest edition)</li> <li>• Norman J. Ashford: Airport Operations (3<sup>rd</sup> edition)</li> </ul>

<b>Network Management and Scheduling</b>			
Modul-Nr./ Code	ATM 34		
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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• judge broad aspects of managing airlines,</li> <li>• relate the basic ideas, concepts and techniques of network management and scheduling,</li> <li>• explain what drives passenger demand,</li> <li>• interpret passenger demand forecasting techniques and data sources,</li> <li>• describe how decision support systems including operational research methods support in the airline scheduling process,</li> <li>• judge the benefits/potential and drawbacks of different airline scheduling decisions,</li> <li>• sketch the process of airline scheduling from long-term forecasting to ad-hoc operations control.</li> </ul>		
Syllabus plan	<p>Key elements of the airline's planning process – fleet planning, network and schedule planning, resource assignment, operations control:</p> <ul style="list-style-type: none"> <li>• airline scheduling process</li> <li>• fleet planning</li> <li>• market demand estimation</li> <li>• data management</li> <li>• network structures</li> <li>• flight scheduling</li> <li>• fleet assignment</li> <li>• aircraft maintenance routing</li> <li>• crew assignment</li> <li>• irregular operations</li> <li>• IT in airline scheduling</li> </ul>		
Semester of studies	3 <sup>rd</sup> semester		
Module duration	1 semester		
Semester hours per week	3		
Frequency of the module offer	Winter/Summer 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 and Piloting – dual (B.Sc.): Aviation Management (B.A.) Aviation Management – dual (B.A.)		
Prerequisites	Completion of ATM 12 Flight Operations is recommended.		
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%) or project work
Duration of examination	90 min (Final written examination) or 12 pages (project work)
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)	<ul style="list-style-type: none"> <li>• Abdelghany, A. &amp; Abdelghany, K.: Airline Network Planning and Scheduling, Wiley.</li> <li>• Belobaba, P., Odoni, A., Barnhart, C.: The Global Airline Industry, Wiley.</li> <li>• Billig, B. &amp; Cook N., G.: Airline Operations and Management: A management textbook, Routledge</li> <li>• Clark, P.: „Buying the Big Jets, Routledge.</li> <li>• Doganis, R.: „Flying Off Course. Airline Economics and Marketing, Routledge.</li> <li>• Goedeking, P.: Networks in Aviation, Springer.</li> <li>• Holloway, S.: „Straight and Level: Practical Airline Economics, Routledge.</li> <li>• Wensveen, G. J.: „Air Transportation“, Routledge.</li> </ul>

<b>Airline Business Models and Strategies</b>			
Modul-Nr./ 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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• report broad aspects of managing airlines,</li> <li>• explain the options of strategic choice in airline management,</li> <li>• locate relevant business trends and their implications,</li> <li>• understand and execute knowledge regarding business models,</li> <li>• describe the most relevant strategy methods in business administration.</li> </ul>		
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 <sup>rd</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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.) Aviation Management – dual (B.A.)		
Prerequisites	Completion of ATM 13 Introduction to Aviation Management is recommended.		
Module co-ordinator	Prof. Dr. Matthias Viehmann		
Module lecturer(s)	Prof. Dr. Klaus Jäckel, R. König		
Instruction language	English		
Examination type / requirements for assigning credit points	Final written / computer-based examination (value: 100%) or project work		
Duration of examination	120 min (final written examination) or 10 pages (project work)		
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	Excursion to airline, guest lectures		

coaching, field trips, guest lecturers, etc.)	
Literature (compulsory reading / additional recommended literature)	<ul style="list-style-type: none"><li>• Osterwalder/Pigneur (2013): Business Model Generation</li><li>• Wunder (2016): Essentials of Strategic Management</li><li>• Shaw (2016): Airline Marketing and Management, 7th Edition, Ashgate</li><li>• Doganis (2006): The Airline Business in the 21st century, 2nd Edition, Routledge</li></ul>



<b>Seminar Aviation Management 2</b>			
Modul-Nr./ Code	ATM 44		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Seminar Aviation Management 2		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• transfer and adapt concepts and methods used in aviation management in the context of own research questions,</li> <li>• solve problems in the area of study by applying appropriate research methods,</li> <li>• develop effective time, self and stress management,</li> <li>• write a seminar paper in line with commonly accepted scientific standards,</li> <li>• prepare and present a structured presentation,</li> <li>• discuss specialised topics in aviation management,</li> <li>• assess the content of other students' seminar papers,</li> <li>• use specialised business terms, definitions and descriptions of problems in various situations.</li> </ul>		
Syllabus plan	Fundamentals of scientific work. Selection of a suitable research topic. Development of research questions and hypotheses. Working out a topic as a paper. Development of a peer review document. Preparation of presentation slides.		
Semester of studies	4 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	4		
Frequency of the module offer	Winter/Summer 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 and Piloting (B.Sc.) Aviation Management (B.A.) Aviation Management – dual (B.A.)		
Prerequisites	Completion of ATM 13 Introduction to Aviation Management and ATM 20 Research Methods, Presentation and Soft Skills is recommended.		
Module co-ordinator	Prof. Dr. Erik Hemmer		
Module lecturer(s)	various		
Instruction language	English		
Examination type / requirements for assigning credit points	Seminar paper (60%), class presentation (25%), peer review (15%) and class attendance of at least 80%		
Duration of examination	Seminar paper: 25 pages main text (text only), presentation 20 min + at least 5 min discussion, oral 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.)	Allocation of topics and introductory session take place in the previous semester. The seminar paper is written during the lecture-free period between the 3rd and 4th semester. The presentations will be held in the 4th semester.
Literature (compulsory reading / additional recommended literature)	See instructor

<b>Bachelor's thesis</b>			
Module-No./ Code	ATM 61		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	Bachelor's thesis		
Trained competencies	Professional Skills Methodological Competence		
Intended learning outcomes of the module	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• organise an independent, systematic and clear treatment of a certain topic,</li> <li>• independently identify and analyse relevant problems,</li> <li>• solve a practical problem by a systematic use of an appropriate choice of theory and methodologies,</li> <li>• independently acquire and handle academic knowledge through independent studies of relevant literature, and</li> <li>• cultivate the ability to evaluate and briefly account for the central elements in a large literature base.</li> </ul>		
Syllabus plan	<p>Students perform a special, directed study in an area of interest. Candidates prepare a detailed proposal for the desired topic and present the proposal as a rule to partnering company and academic supervisor for review.</p> <p>The Bachelor's thesis is a written document on an air traffic management topic supervised throughout its preparation by the student's Thesis Committee. The Bachelor's thesis demonstrates the student's mastery of the topic.</p>		
Semester of studies	6 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	0		
Frequency of the module offer	Winter/Summer 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	<p>Completion of ATM 44 Seminar Aviation Management 2 is recommended.</p> <p>At least 100 CP of all modules.</p>		
Module co-ordinator	Prof. Dr. Richard Klophaus		
Module lecturer(s)	various		
Instruction language	German/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

<b>Aeronautical English Oral</b>			
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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• demonstrate the knowledge of aeronautical English</li> <li>• express themselves in an aeronautical environment</li> <li>• explain given situations in form of an interview</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Introduction <ul style="list-style-type: none"> <li>○ Basic questions and concepts</li> </ul> </li> <li>• Aerodrome <ul style="list-style-type: none"> <li>○ Layout</li> <li>○ Lightning</li> <li>○ Marking</li> </ul> </li> <li>• Aircraft <ul style="list-style-type: none"> <li>○ Shapes</li> <li>○ Components</li> <li>○ Noise</li> </ul> </li> </ul>		
Semester of studies	4 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer semester		
Amount of assigned credit points	3		
Total workload	90 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	Marc Büttner, PA/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	1,76%		
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)	<ul style="list-style-type: none"><li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li></ul>
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<b>Legal Bases and Aeronautical Basics</b>			
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	<p>On successful completion of this course with defined subjects, the students shall be able to</p> <ul style="list-style-type: none"> <li>• (DFS) demonstrate basic knowledge of the company structure of the DFS</li> <li>• (NLE) demonstrate basic knowledge of National Rules and Regulations in regard of aviation in Germany</li> <li>• (ATLA) demonstrate basic knowledge of Air Traffic Management Rules and Regulations</li> <li>• (ATLA) demonstrate basic knowledge of International Air Law</li> <li>• (RTF) explain the use of communication systems in aviation</li> <li>• (MET/NAV) explain the basic parameters in regard of altimetry and the atmosphere</li> <li>• (ACFT) explain the differences between aircraft drives and the interaction of forces on aircraft</li> <li>• (NAV) explain the different metering possibilities on the globe and differentiate between the ones used in aviation and others</li> </ul>		
Syllabus plan	<p>Generic aspects (not related to any specific environment):</p> <ul style="list-style-type: none"> <li>• Company structure of DFS</li> <li>• National Rules and Regulations in regard of aviation in Germany</li> <li>• Air Traffic Management Rules and Regulations</li> <li>• International Air Law</li> <li>• communication systems in aviation</li> <li>• altimetry and the atmosphere</li> <li>• aircraft physics</li> <li>• metering possibilities on the globe</li> </ul>		
Semester of studies	4 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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	Marc Büttner		

Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2007): Radio Telephony. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2018): Location Indicators. ICAO Doc. 7910, 167. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2017): Aircraft Type Designators. ICAO Doc. 8643, 45. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2017): Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services. ICAO Doc. 8585, 182. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2005): Rules of the Air. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal</li> <li>• Deutsche Flugsicherung (Hrsg.) (2017): Bekanntmachung über die Sprechfunkverfahren, NfL 2021-1-2304, DFS, Langen (Hessen)</li> <li>• Bundesministerium für Justiz und für Verbraucherschutz (Hrsg): Luftverkehrsgesetz, Version 20.07.2017, Deutschland, Berlin</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Europäische Union (Hrsg.) (2015): 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. EU, Brüssel.</li> <li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li> </ul>



<b>Tower Operations and Aeronautical Basics</b>			
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	<p>On successful completion of this course, students shall be able to</p> <ul style="list-style-type: none"> <li>• (NLE) demonstrate basic knowledge of National Rules and Regulations in regard of aviation in Germany</li> <li>• (ATLA) demonstrate basic knowledge of Air Traffic Management Rules and Regulations</li> <li>• (ATLA) demonstrate basic knowledge of International Air Law</li> <li>• (RTF) explain the use of communication systems in aviation</li> <li>• (MET/NAV) explain the basic parameters in regard of altimetry and the atmosphere</li> <li>• (ACFT) explain the differences between aircraft drives and the interaction of forces on aircraft</li> <li>• (NAV) explain the different metering possibilities on the globe and differentiate between the ones used in aviation and others</li> <li>• (TWR PRESIM) describe the basic principles of air traffic management procedures in a Tower environment</li> <li>• (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</li> </ul>		
Syllabus plan	<p>Aspects related to Tower environment:</p> <ul style="list-style-type: none"> <li>• National Rules and Regulations in regard of aviation in Germany</li> <li>• Air Traffic Management Rules and Regulations</li> <li>• International Air Law</li> <li>• communication systems in aviation</li> <li>• altimetry and the atmosphere</li> <li>• aircraft physics</li> <li>• metering possibilities on the globe</li> <li>• principles of air traffic management procedures in a Tower environment</li> <li>• equipment in use in ATC</li> </ul>		
Semester of studies	4 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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: PA/A, PA/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.)	<ul style="list-style-type: none"> <li>• Use of Electronic Learning Programs (e.g. Location Indicators, Aircraft Recognition Program)</li> <li>• Simulation Exercises with clear correlation to the previously taught theory lesson</li> <li>• Field trip to an International Aerodrome Control Tower</li> </ul>
Literature (compulsory reading / additional recommended literature)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2007): Radio Telephony. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2018): Location Indicators. ICAO Doc. 7910, 167. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2017): Aircraft Type Designators. ICAO Doc. 8643, 45. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2017): Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services. ICAO Doc. 8585, 182. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2005): Rules of the Air. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal</li> <li>• Deutsche Flugsicherung (Hrsg.) (2017): Bekanntmachung über die Sprechfunkverfahren, NfL 2021-1-2304, DFS, Langen (Hessen)</li> <li>• Bundesministerium für Justiz und für Verbraucherschutz (Hrsg.): Luftverkehrsgesetz, Version 20.07.2017, Deutschland, Berlin</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Europäische Union (Hrsg.) (2015): 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. EU, Brüssel.</li> <li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li> </ul>



<b>Tower Procedures</b>			
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	<ul style="list-style-type: none"> <li>principles of air traffic management in a Tower environment</li> <li>basic operational procedures in a Tower environment</li> </ul>		
Semester of studies	4 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer semester		
Amount of assigned credit points	5		
Total workload	150 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: PA/A, PA/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 – 60 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	2,94%		
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)	<ul style="list-style-type: none"> <li>International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>International Civil Aviation Organisation (Hrsg.) (2007): Radio Telephony. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal</li> </ul>		

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|  | <ul style="list-style-type: none"><li>• International Civil Aviation Organisation (Hrsg.) (2005): Rules of the Air. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal</li><li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li><li>• Deutsche Flugsicherung (Hrsg.) (2017): Bekanntmachung über die Sprechfunkverfahren, NfL 2021-1-2304, DFS, Langen (Hessen)</li><li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li></ul> |
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<b>Airspace and Basic Operational Procedures</b>			
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	<p>On successful completion of this module, students shall be able to</p> <ul style="list-style-type: none"> <li>• understand and apply the basic principles to provide air traffic services within the defined area of responsibility</li> <li>• apply basic control, planning techniques and operational procedures to traffic</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Introduction to rating</li> <li>• Aviation Law</li> <li>• Air Traffic Management, in particular</li> <li>• Introduction to simulation area and procedures</li> <li>• Basic Control, Planning and Communication Procedures</li> <li>• Practical part task exercises</li> <li>• Meteorology</li> <li>• Navigation</li> <li>• Aircraft</li> </ul>		
Semester of studies	5 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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 55		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Europäische Union (Hrsg.) (2015): 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. EU, Brüssel.</li> <li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li> </ul>

<b>Operational Procedures</b>			
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	<p>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.</p> <p>In addition, the applicants</p> <ul style="list-style-type: none"> <li>• manage the light workload and provide air traffic services within the defined area of responsibility</li> <li>• apply standard control, planning techniques and operational procedures to traffic</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Air Traffic Management, in particular <ul style="list-style-type: none"> <li>• Simulation area and procedures</li> <li>• Control, Planning and Communication Procedures</li> <li>• Practical exercises and Simulations</li> </ul> </li> <li>• Navigation</li> <li>• Professional Environment</li> <li>• Abnormal and Emergency Situations</li> </ul>		
Semester of studies	5 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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 55, ATM 50		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Europäische Union (Hrsg.) (2015): Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Piloten. EU, Brüssel.</li> <li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li> </ul>

<b>Advanced Operational Procedures</b>			
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	<p>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.</p> <p>In addition, the applicants</p> <ul style="list-style-type: none"> <li>• manage the medium workload and provide air traffic services within the defined area of responsibility</li> <li>• apply advanced control, planning techniques and operational procedures to traffic</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Air Traffic Management, in particular <ul style="list-style-type: none"> <li>• Simulation area and procedures</li> <li>• Advanced Control, Planning and Communication Procedures</li> <li>• Practical exercises and Simulations</li> </ul> </li> <li>• Human Factors</li> <li>• Equipment and Systems</li> <li>• Professional Environment</li> </ul>		
Semester of studies	5 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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 55, ATM 50, ATM 51		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Europäische Union (Hrsg.) (2015): 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. EU, Brüssel.</li> <li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li> </ul>

<b>Consolidation of Operational Procedures and MO-ATS (Manual of Operations Air Traffic Services)</b>			
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	<p>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.</p> <p>In addition, the applicants</p> <ul style="list-style-type: none"> <li>• manage the high workload and provide air traffic services within the defined area of responsibility</li> <li>• apply control, planning techniques and operational procedures to traffic</li> <li>• show the behaviour required for safe operation within air traffic control service</li> </ul>		
Syllabus plan	<ul style="list-style-type: none"> <li>• Air Traffic Management, in particular <ul style="list-style-type: none"> <li>• Simulation area and procedures</li> <li>• Control, Planning and Communication Procedures</li> <li>• Practical exercises and Simulations</li> </ul> </li> <li>• Abnormal and Emergency Situations</li> </ul>		
Semester of studies	5 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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 55, ATM 50, ATM 51, ATM 52		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Europäische Union (Hrsg.) (2015): Verordnung (EU) 2015/340 der Kommission vom 20. Februar 2015 zur Festlegung technischer Vorschriften und von Verwaltungsverfahren in Bezug auf Lizenzen und Bescheinigungen von Piloten. EU, Brüssel.</li> <li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li> </ul>

<b>Air Traffic Control Procedures and Implications</b>	
Module-No./ Code	ATM 54
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	<p>On successful completion of this course, students shall be able to</p> <ul style="list-style-type: none"> <li>• (ATLA) recap basic knowledge of National Rules and Regulations in regard of aviation in Germany mainly for the Surveillance environment</li> <li>• (ATLA) demonstrate knowledge of Air Traffic Management Rules and Regulations mainly for the Surveillance environment</li> <li>• (ATLA) demonstrate knowledge of International Air Law mainly for the Surveillance environment</li> <li>• (RTF) explain the use of communication systems in aviation mainly for the Surveillance environment</li> <li>• (MET/NAV) explain the parameters in regard of altimetry and the atmosphere mainly for the Surveillance environment</li> <li>• (ACFT) explain the differences between aircraft drives and the interaction of forces on aircraft mainly for the Surveillance environment</li> <li>• (NAV) explain the different navigation methods in aviation</li> <li>• (NAV) apply basic calculation methods on the basis of the different metering systems in aviation</li> <li>• (ATLA) describe the basic principles of air traffic management procedures for the Surveillance Environment</li> <li>• (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.</li> </ul>
Syllabus plan	<p>Aspects related to Surveillance environment:</p> <ul style="list-style-type: none"> <li>• National Rules and Regulations in regard of aviation in Germany</li> <li>• Air Traffic Management Rules and Regulations</li> <li>• International Air Law</li> <li>• communication systems in aviation</li> <li>• altimetry and the atmosphere</li> <li>• aircraft physics</li> <li>• navigation methods in aviation</li> <li>• calculation methods in aviation</li> <li>• principles of air traffic management procedures</li> <li>• equipment in use in ATC</li> </ul>
Semester of studies	5 <sup>th</sup> semester
Module duration	1 semester
Semester hours per week	n/a
Frequency of the module offer	Winter 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 42, ATM 43		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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		
Special characteristics of the module (e.g. online teaching and coaching, field trips, guest lecturers, etc.)	<ul style="list-style-type: none"> <li>• Use of Electronic Learning Programs (e.g. eSeeAviaion, ROSE)</li> <li>• Simulation Exercises with clear correlation to the previously taught theory lesson</li> </ul>		
Literature (compulsory reading / additional recommended literature)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2007): Radio Telephony. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2018): Location Indicators. ICAO Doc. 7910, 167. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2017): Aircraft Type Designators. ICAO Doc. 8643, 45. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2017): Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services. ICAO Doc. 8585, 182. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2005): Rules of the Air. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal</li> <li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li> <li>• Deutsche Flugsicherung (Hrsg.) (2017): Bekanntmachung über die Sprechfunkverfahren, NfL 2021-1-2304, DFS, Langen (Hessen)</li> <li>• Bundesministerium für Justiz und für Verbraucherschutz (Hrsg.): Luftverkehrsgesetz, Version 20.07.2017, Deutschland, Berlin</li> </ul>		

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|  | <ul style="list-style-type: none"><li>• Europäische Union (Hrsg.) (2015): 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. EU, Brüssel.</li><li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li></ul> |
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<b>Surveillance Procedures</b>			
Module-No./ Code	ATM 55		
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	<ul style="list-style-type: none"> <li>• principles of air traffic management in a Surveillance environment</li> <li>• basic operational procedures in a Surveillance environment</li> </ul>		
Semester of studies	5 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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	ATM 54		
Module co-ordinator	Bernd Schlebusch		
Module lecturer(s)	DFS academy instructors from following departments: PA/A, PA/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 – 60 min.		
Examination graded / not graded	Graded		
Weighting of the mark within the cumulative grade	1,18%		
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)	<ul style="list-style-type: none"> <li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li> <li>• International Civil Aviation Organisation (Hrsg.) (2007): Radio Telephony. ICAO Doc. 9432, 4. Auflage. ICAO, Montreal</li> </ul>		

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|  | <ul style="list-style-type: none"><li>• International Civil Aviation Organisation (Hrsg.) (2005): Rules of the Air. Annex 2 to the Convention on International Civil Aviation, 10. Edition. ICAO, Montreal</li><li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li><li>• Deutsche Flugsicherung (Hrsg.) (2017): Bekanntmachung über die Sprechfunkverfahren, NfL 2021-1-2304, DFS, Langen (Hessen)</li><li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li></ul> |
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<b>On the Job Training (OJT)</b>			
Module-No./ Code	ATM 60		
Course of studies	Air Traffic Management – dual (B.Sc.)		
Courses of the module	ATM 601 Pre-OJT ATM 602 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 <ul style="list-style-type: none"> <li>• Airspace and Procedures in related sectors</li> <li>• Control, Planning and Communication Procedures in related sectors</li> <li>• Simulator exercises in related sectors</li> <li>• Practical work under supervision of a licensed OJTI</li> <li>• Human Factors</li> <li>• Teamwork</li> </ul>		
Semester of studies	6 <sup>th</sup> semester		
Module duration	1 semester		
Semester hours per week	n/a		
Frequency of the module offer	Winter/Summer 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 55, ATM 50, ATM 51, ATM 52, ATM 53		
Module co-ordinator	Dennis Voß		
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		

<p>Literature (compulsory reading / additional recommended literature)</p>	<ul style="list-style-type: none"><li>• International Civil Aviation Organisation (Hrsg.) (2016): Procedures for Air Navigation Services – Air Traffic Management. ICAO Doc. 4444, 16. Auflage. ICAO, Montreal</li><li>• Europäische Union (Hrsg.) (2015): 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. EU, Brüssel.</li><li>• Mensen, H. (2014): Moderne Flugsicherung. 4. Auflage. Springer-Verlag, Heidelberg</li><li>• DFS Deutsche Flugsicherung GmbH (Hrsg.): Manual of Operations Air Traffic Management, MO-ATM, Edition Jan. 2022 (actual version), DFS, Langen (Hessen)</li></ul>
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