**University of Management and Technology**

**Course Outline**

**Course Background Details:**

|  |  |
| --- | --- |
| Program | BS Aviation Management  |
| Course code | AM201 |
| Course Title | Airspace & Air Traffic Management |
| Credit Hours | 03 |
| Duration | 15 Weeks  |
| Prerequisites | AM112 : Aviation Sciences AM-161 : Aviation Law |
| Resource Person | Muhammad Iqbal Khan |
| Counseling Timing | 06 hours per week  |

**Description:**

Effective Air Traffic Management can only be achieved when one’s mind glows with the sense of Air Traffic, ability of anticipation, Judgement and timely decision making. This unique course will help you in understanding the rules and skills necessary for successfully and effectively managing Air Traffic needs, keeping in view the prevailing circumstances of flight operations. It also aims at imparting knowledge about an Aerodrome Control Tower, its working, procedures & separations to be followed, and communication between Pilots & Air Traffic Controller. Learning of Aerodrome Control in a professional manner will be complemented by a class activity. The focus of the course is on the acquisition of knowledge and skills to enable identify technical characteristics of ATM, understand Governance and Safety Regulation systems in an ATM environment. Economic regulatory requirements and Next-Gen ATM systems will also be introduced.

**Contact Details:**

**Lecturer**: Muhammad Iqbal Khan. **Email**: *iqbal.khan@umt.edu.pk*

**Course Learning Outcomes: (CLOs)**

|  |  |  |
| --- | --- | --- |
| **S No.** | **CLO Statement** | Learning Domain and level |
| 1 | Understand the basic rules, regulations, underline concepts and latest trends of Air Traffic Management. | C 1 |
| 2 |  Familiarize with the Role & Task of ATM in Global Economy. | C2 |
| 3 |  Develop problem solving and analytical skills in Traffic management with utilization of practical demonstration activities. | C3 |
| 4 |  Appraise Economic Characteristics of Air Traffic Management and Future Directions Introducing Competition in the Provision of Air Traffic Management  | C4 |

**CLO – PLO Mapping:**

|  |  |
| --- | --- |
| **CLOs** | **PLOs** |
| Critical Thinking and Decision Making | Effective Communication Skills | Ethics | Core Business Knowledge and Competence | Effective Teamwork | Industry Focus | Global Perspective (Internationalization) | Leadership Skills | Computer-based Information | Corporate Social Responsibility | Organizational Behavior |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1 |  |  |  | C1 |  |  |  |  |  |  |  |
| 2 |  |  |  | C2 |  | C2 | C2 |  |  |  |  |
| 3 | C3 | C3A2 |  | P2 | C3 | C3 |  |  | C3 |  |  |
| 4 |  |  |  | C4 |  | C4 | C4 |  |  | A2 |  |

**Note: The three domain levels (affective, cognitive, psychomotor) are described below:**

**A:** The affective domain includes the feelings, emotions and attitudes of the individual through the levels i.e. receiving, responding, valuing, organizing and characterization by a value complex.

**C:** Cognitive domain deals with the intellectual learning process through the levels i.e. Knowledge, comprehension, Application, Analysis, Synthesis and Evaluation**.**

**P:** Psychomotor domain focuses on skills and actions that require physical coordination through the levels i.e. Imitation, Manipulation, Precision, Articulation & Naturalization.

**Learning Methodology:**

The course will be delivered through a series of lectures and workshops/Practical (Activity Based). This course is unique in the sense that it incorporates two special assignments, one is a research one and the other is an activity/Scenario-based practical assignments. These two assignments will help to develop a research insight, foster creativity and critical thinking and above all create more interest in the course. A case study alongside an embedded ethical dilemma is also included as a special topic.

**Resources:**

**Text Books**

1 Arblaster, M. (2018). *Air Traffic Management: Economics, Regulation and Governance.* Elsevier Science. (Available at UMT Liberary )

2  Procedures for Air Navigation And Air Traffic Management Pans-ATM Doc 4444. 16th edition Montréal: ICAO. 2016 (Available on Internet)… https://ops.group/blog/wp-content/uploads/2017/03/ICAO-Doc4444-Pans-Atm-16thEdition-2016-OPSGROUP.pdf…url

**Reference Books**

1. (ICAO, 2005) Rules of the Air https://www.icao.int/Meetings/anconf12/Document%20Archive/an02\_cons%5B1%5D.pdf

2 (ICAO, 2001) Air Traffic Services https://www.theairlinepilots.com/forumarchive/quickref/icao/annex11.pdf by International Civil Aviation Organization

**Reference Journal Articles**

1. Unmanned Traffic Management: ECO system UTM solution helps addressing the challenges of UAS integration into the airspace. The digital cloud-based platform proposes a suite of services for low altitude airspace management which enable safe, secured and efficient manned and unmanned operations:

https://www.thalesgroup.com/en/markets/aerospace/air-traffic-management/unmanned-traffic-management

1. From Digital Tower to Digital Airport: How digital tower technology can be applied within existing towers to solve real operational challenges. www.International Airport review, June 2019
2. Optimizing Gate Management: Discussion on How the airport’s gate optimization project has Seattle Tacoma International Airport (SEA) to become the most efficient airport in U.S. from gate management perspective. , www.International Airport review, April 2020.

**Online resources and links:**

I The history of aviation safety: Putting passengers’ safety first along with time line.

https://www.youtube.com/watch?v=teO37fLsgeI

II ATC Communications and Radio Basics (Talking to Air Traffic Control): A video which shows how Tower Controller and Pilot communicate each other. <https://www.youtube.com/watch?v=zBWVfz6GEgk> ATC communication &Radio

III Traffic Pattern: What is Aerodrome Traffic circuit and how does the Air traffic operate in Aerodrome Traffic circuit. <https://www.youtube.com/watch?v=w_Bbs4K7L5U>

IV Future Air traffic management Concept & Evaluation or Tools (FACET): How research being carried out to find solutions of future Air traffic issues. <https://www.youtube.com/watch?v=DtxxJHry4wQ>

www.icao.int

www.iata.org

www.caapakistan.com.pk

www.easa.europa.eu

www.faa.gov

**Schedule:**

|  |  |  |  |
| --- | --- | --- | --- |
|  **Week** |  **Course Contents**  | Reference Text BookChapter(s) | Reference of CLO |
|  1 | The Air Traffic Management Industry | Book.1 Chapter 1 | 1 |
|   2 | Operational and Technological Background on Air Traffic Management | Book.1 Chapter 2 |  1 ,2 |
|  3 |  Governance of Air Traffic Management(An International Perspective)(Quiz No-1) |  Book.1 Chapter 3 |  1,2 |
|  4 | Governance of Air Traffic Management(A National Perspective)Assignment-1(Research) | Book.1 Chapter 4 | 1,2, |
|  5 | Aerodrome & Aerodrome Control ServiceFunctions of Aerodrome Control TowerAlerting Service Provided by Aerodrome Control TowerSelection of Runway in useInformation to Aircraft by Aerodrome Control Tower  | Book.2Chapter 7 | 1,2,  |
|  6 |  Essential Information on Aerodrome ConditionsDesignated Positions of Aircraft in Aerodrome Traffic and taxi circuitsControl of Aerodrome Traffic Radio Communication w.r.t Aerodrome.(Quiz 2) | Book.2Chapter 7 | 1,2, 3 |
|   7 |  Safety Regulation on Air Traffic Management | Book.1 Chapter 5 | 1,2,,4 |
|  8 | Assignment-2(Activity) (Class activity on Aerodrome Control)**(MID TERM-** Time 1:30hrs) | Book. 2Chapter 7 |  1, ,3 |
|  9 | Economic Regulation of ATMEconomic Characteristics of Air Traffic Management(Quiz 3) | Book-1Chapter 6 | 1,2, |
| 10 |  Economic Regulation of Air Traffic Management. (Principles and Approaches)Assignment-3 (Activity):Discussion (individual) | Book.1Chapter7  | 1.2, |
| 11 |  Economic Regulation of ATMThe Structure of Charges | Book.1Chapter 8 | 1,2, |
| 12 | Economic Regulation of ATM(Consultation on Investment) (Quiz 4)  | Book.1Chapter 9 | 1,2, |
| 13 | Future DirectionsIntroducing Competition in the Provision of Air Traffic Management Presentation (Group) | Book.1Chapter 10 | 1,2,,4 |
| 14 | New Entrant in to Airspace:Unmanned Aircraft “Droned” and Increased Space Transportation(Quiz 5) | Book.1Chapter 11 | 1,2,4 |
| 15 | Discussion on Professional Ethics. **(****Case study with an ethical dilemma – Marked activity)**[**https://admiralcloudberg.medium.com/philosophy-of-blame-the-story-of-the-1976-zagreb-mid-air-collision-38202bfc1ad7**](https://admiralcloudberg.medium.com/philosophy-of-blame-the-story-of-the-1976-zagreb-mid-air-collision-38202bfc1ad7) | Lecturer provided Case Study and Notes | 2,3,4 |

**Assessments:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assessment** | **Weightage** | **Detail** | **Due** |
| Quiz-1 Quiz-2Quiz-3Quiz-4Quiz-5 | 3%3%3%3%3% | Covers Topics: book.1,Chapter1,2,3Covers Topics: Book 2, Chapter7Covers Topics: Book 1, Chapter4,5,Covers Topics: Book 1, Chapter6,7Covers Topics: Book 1, Chapter8,9 | 3rd session6th session9th session12th session14th session |
| Assignment-1Assignment-2Assignment-3Presentation (Group)Assessment-4 | 5%10%5%5%10% |  Research Assignment Activity Assignment Find an Air Traffic Controller and discuss him/her with the class. See details below. Proposed topics are listedbelow.Case study with an ethical dilemma (in class activity and grading) | 4th session8th session10th session13th session15th Session |
| Mid Exam (Written) | 20% | MCQs and/or Short Essay Qs | 8th session |
| Final Exam(Written) | 30% | MCQs and/or Case Study | As per Controller Exams |

**Quizzes:**

There will be a total of four quizzes. Each quiz will comprise of 10 MCQs with four options for each question. The topics for each quiz are listed above.

**Assignment 1 (Research):**

Instructor can select the research assignment from the current topics as below:

Develop a report on the problems (at least 5) that can be faced by

 **“The increasing drone traffic in European skies. How can these be managed safely, in particular relation to commercial air transport.”**

**Purpose of this Activity is:**

i.To polish skills of students.

ii. To enable students to study /explore relevant topic

iii. To motivate students to excel in this industry.

**Directions:**

**•** Word limit: 1000 to 1500 words

• Submission: Via Turn tin

**Structure of Report**

* Use Times New Roman 12 font size with line spacing of 1.5 and justify from both sides.

**Assignment-2(Activity)**

Class activity / practical of controlling Aircraft (including Taxi, Take off, Landing, Parking) from Aerodrome Control Tower.

 **Class activity: “A 3d Tower computer based activity (consisting of traffic of 3 different airports) demonstrated in the class. Students will be given the opportunity to practice followed by a marked activity|”**

**Purpose of this Activity is to enable students**:

* To familiarize with the working of Control Tower.
* To keep themselves aware with the traffic situation.
* To improve their judgement, planning, problem solving and decision making skills.

**Directions::**

During practical of controlling Aircraft (including Taxi, Take off, Landing, Parking) from Aerodrome Control Tower, Students will be evaluated in the following points

* Situational Awareness, (Are you aware with conflicting traffic while handling above traffic)
* Judgement, planning of traffic (Are you able to judge / plan traffic in advance)
* Problem solving and decision making (How will you solve conflicting traffic and take appropriate decisions)
* Marking Guide/Rubric: Attached

**Assessment Method :**

* Every student will have to conduct at least 5 movements (Departures/Arrivals) with different situation.

**Assignment-3 (Activity):**

**Search online and find at least one person on a position of Air Traffic Controller and share his/her professional experience and educational background with class.**

**You may use LinkedIn or other professional websites for assistance and to find interesting facts about the air traffic Controller of your choice.**

**Purpose of this Activity:**

**i.** To polish communication skills of students.

ii. To enable students to find many possible paths to reach the position of Air Traffic controller

iii. To motivate students to excel in the industry.

**Directions:**

**•** Word limit: 1000 words

• Submission: Via Turn tin

**Structure of Report:**

• Use Times New Roman 12 font size with line spacing of 1.5 and justify from both sides.

Marking Guide/Rubric: Attached

**Presentation (Group):**

The lecturer may allocate topics from below to any group or individual to explore and present before the class:

* Visual Docking System,
* Stress Factor in Air Traffic Control,
* Reduced vertical separation minima (RVSM) airspace procedures,
* Controller Pilot Data Link,
* Automatic Dependent Surveillance,
* Meteorological Services
* Airborne Collision Avoidance System,
* Performance Based Navigation (PBN) Procedures,

**Directions**

**Points that “Must” be covered in Your Presentation**

1. Briefly describe the Topic and its working.

2. Advantages and disadvantages

3. Identify solutions to control the disadvantages**.**

**Directions**

1. Time Allowed: 15-20 minutes

2. Group: Each group may have 04 members

3- Each member to present for at least 3 minutes

4 – Questions shall be asked towards the end of presentation at random.

5- The performance evaluation shall be based on body language, dress,tone ,pith ,time management ,logical delivery covering the topic and ability to answer questions.

**Assessment. 4 (Ethics):**

Discussion on Professional Ethics

A Case Study on an Ethical Dilemma will be provided and discussed, as one provided below.

This is an in-class activity and the lecturer will award marks (10%) based on the responses on the above questions.

**Study the case:**

On the 10th of September 1976, tragedy unfolded in the skies over Yugoslavia as two airliners collided at 33,000 feet, scattering burning debris over a 320-square-kilometer stretch of the Croatian countryside. The horrifying crash killed all 176 passengers and crew aboard both planes, forever traumatized two villages, and triggered a legal battle over who was to blame. As British and Yugoslav investigators sought to uncover the cause, authorities arrested the air traffic controllers who were on duty at the time of the crash and charged them with “endangering air traffic.” But a grassroots effort by other controllers contended that the real cause was not one man’s mistake, but a fatally deficient air traffic control system. A reckoning ensued with major implications for the safety of Yugoslavia’s airways: would the government get away with scapegoating controller Gradimir Tasić, or would it acknowledge that its treatment of air traffic controllers had always been a disaster waiting to happen? For further information on this case study, please see the following link from <https://admiralcloudberg.medium.com/philosophy-of-blame-the-story-of-the-1976-zagreb-mid-air-collision-38202bfc1ad7>

Read the above mentioned report and analyze the case.

Following points “Must” be covered in analysis (make separate heading for each):

i. Identify and briefly causes of the disaster

ii. Briefly describe, Controllers point of view about the cause of accident?

iii. Briefly describe Richard Weston, (representing a British victim of the crash on behalf of the prosecution) point of view about the disaster?

iv. Briefly describe your point of view about the disaster?

Directions:

• Word limit: 1000 to 1500 words

• Submission: Via Turitin

• Marking will be based on how well you covered the above mentioned points.

Structure of Report

• Use Times New Roman 12 font size with line spacing of 1.5 and justify from both sides

**Mid Exam** will comprise of MCQs and/or Short Essay type questions

**Final Exam:**

Final Exam will comprise of MCQs and a short case with associated questions. The case will be distributed one week before the exam along with some practice questions from the case.

**Academic Integrity:**

All students are required to uphold the highest levels of academic integrity while participating in this course.

Academic integrity is about: honesty, trust, fairness, respect and responsibility in all work and is vital for any research/scholarship. We need to give proper credit to those who do the work and acknowledge their intellectual contribution. All students enrolled in IAS are to adhere to academic integrity while completing each assessment task.

Dishonesty in assessment can lead to a requirement to undertake additional work, failure in a unit or in a part of it, suspension from the University or even permanent expulsion from the University.

Plagiarism (a form of dishonesty) constitutes using the work of another without indicating by referencing (and by quotation marks when exact phrases or passages are borrowed) that the ideas expressed are not one's own.

**Final Grade:**

Students need to obtain an overall 50% mark to pass this course.

**Class Policy**

**STUDENTS ARE REQUIRED TO READ AND UNDERSTAND ALL ITEMS OUTLINED IN THE PARTICIPANT HANDBOOK**

**CLASS ATTENDANCE:** Students need to be in class at the assigned time.

**TURN OFF MOBILE PHONE**: It is unprofessional to be texting or otherwise.

**READ EMAILS:** Participants should regularly check their university emails accounts regularly and respond accordingly. Students would be responsible if they miss a deadline because of not reading the emails.

**CLASS ATTENDANCE POLICY:** A minimum of 80% attendance is required for a participant to be eligible to sit in the final examination. Being sick and going to weddings is absence and will not be counted as present. Participants with less than 80% of attendance in a course will not be allowed to take end term exams. International students who will be leaving for visa during semester should not use any days off except for visa trip to avoid reaching short attendance.

**MOODLE:** UMT –LMS (Moodle) is an Open Source Course Management System (CMS), also known as a learning Management System (LMS). Participants should regularly visit the

course website on MOODLE Course Management system, and fully benefit from its capabilities. In case of any problem while using MOODLE, visit <http://oit.umt.edu.pk/moodle>. For queries email moodle@umt.edu.pk

**HARASSMENT POLICY:** Sexual or any other harassment is prohibited and is constituted as punishable offence. Sexual or any other harassment of any participant will not be tolerated. All actions categorized as sexual or any other harassment when done physically or verbally would also be considered as sexual harassment when done using electronic media such as computers, mobiles, internet, emails etc.

**USE OF UNFAIR MEANS/ HONESTY POLICY:** Any participant found using unfair means or assisting another participant during a class test/quiz, assignments or examination would be liable to disciplinary action.

**PLAGIARISM POLICY:** All students are required to attach a “Turnitin” report on every assignment, big or small. Any student who attempts to bypass “Turnitin” will receive “F” grade which will count towards the CGPA. The participants submit the plagiarism report to the resource person with every assignment, report, project, thesis etc. If student attempts to cheat Turnitin, a second “F” will be awarded that will count towards the CGPA. There are special rules on plagiarism for final reports etc. all outlined in your handbook.

**COURSE WITHDRAWAL POLICY:** Students may withdraw from a course till the end of the 12th week of the semester. Consequently, grade ‘W’ will be awarded to the student which shall have no impact on the calculation of the GPA of the student. A Student withdrawing after the 12th week shall be automatically awarded “F” grade which shall count in the GPA.

**COMMUNICATION OF RESULTS:** The results of quizzes and assignments are communicated to the participants during the semester and answer books are returned. It is the responsibility of the course instructor to keep the participants informed about his/her progress during the semester. The course instructor will inform a participant at least one week before the final examination related to his or her performance in the course.

# References

Arblaster, M. (2018). *Air Traffic Management: Economics, Regulation and Governance.* Elsevier Science.