



Universidad
Politécnica
de Cartagena



Centro
Universitario
de la Defensa

Meteorology and Communications Phraseology Syllabus

Industrial Organization Engineering Degree

Academic Year 2013-2014



1. Course details

Name	Meteorology and Communications Phraseology				
Course field	Meteorology and Communications Phraseology				
Code	511103009				
Degree Course	Industrial Organization Engineering Degree				
Programme	2009 (Decreto 269/2009 de 31 de julio)				
Faculty	University Centre of Defense at the Spanish Air Force Academy				
Type	Compulsory				
Duration	Four-month course			Year	4 th
Language	Spanish/English				
ECTS	4.5	Hours / ECTS	25	Total workload (hours)	112.5
Lectures Timetable	Section A: Monday 16:05 – 16:55 17:00 – 17:50 Wednesday 17:55 – 18:45 Section B: Monday 17:55 – 18:45 Wednesday 16:05 – 16:55 17:00 – 17:50		Room	Section A: 3.1 Section B: 4.1	
Classes/Practicals/Seminars timetable	The same as lectures Timetable		Building	Several	



2. Teaching Staff details

Head of the course	José Serna Serrano		
Department	Integration		
Area of expertise	Aerospace Engineering		
Office location	Room 28 @ CUD building		
Phone	+34.968.189927	Fax	+34.968188780
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URL / WEB	Aula Virtual UPCT		
Office hours (for supervisions)	TBD 2013-2014		
Office hours location (for supervisions)	Room 28 @ CUD building		
Academic and Research Profile	Aeronautical Engineer. Ph.D. at the Universidad Politécnica de Madrid. (Aerospace Science and Technology Program)		
Academic Background	Taught subjects: Energetic Technology, Fundamentals of flight, Aerodynamics, Avionics and General Aircraft Knowledge.		
Research Lines	<ul style="list-style-type: none"> * Experimental Aerodynamics: facilities design, instrumentation and experimental tests. * Boundary layer stability and control: experimental and numerical researches. * Aerodynamic profiles for "low" Reynolds numbers aerodynamics. * Heat Transfer Applications. 		
Professional Background	<ul style="list-style-type: none"> * Fluid Mechanics Laboratory. School of Aeronautics. UPM (basic and industrial research) > 7 years. * BBVA (Quantitative developer at front desk: equity and FX derivatives valuation). 1 year. 		
Other interests	UAVs: technology and integration in the air space.		

Meteorology Lecturer 1	Juan Andrés García Valero		
Department	Meteorology		
Area of expertise	Atmosphere Physics. Meteorology and Climatology		
Office location	AEMET territorial delegation in Murcia		
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URL / WEB	
Office hours (for supervisions)	TBD 2013-2014
Office hours location (for supervisions)	Virtual Classroom
Academic and Research Profile	<ul style="list-style-type: none"> * Meteorologist * DEA (UPCT): "Variability of Daily Precipitations over Murcia region". * PhD Thesis (in course) "Climate variability over the Iberian Peninsula and its connection with atmosphere dynamics"
Academic Background	<ul style="list-style-type: none"> * University of Murcia. Physics Department. Associate Lecturer from 2010-2011: Earth Physics (2nd course Physical Sciences Degree), Meteorology and Climatology (4th course Environmental Sciences Degree), Climatology (MSc TAYGA). * Spanish Airforce Academy. Aeronautical Meteorology (2nd course CGSO and 1st course CGO) from 2005 to 2009; Aeronautical Meteorology (Internal promotion) academic year 2012-2013. * AEMET. Internal courses (coordination and teaching).
Research Lines	<ul style="list-style-type: none"> * Member of the MAR group (Regional Atmosphere Modelling) at the University of Murcia. * Climate variability: Circulation Types, climatic extremes.
Professional Background	<ul style="list-style-type: none"> * Airbase of Talavera La Real (Badajoz). Forecaster. 3 years. * Spanish Air Force Academy. Meteorological office chief. 3 years * AEMET (Región de Murcia). Studies and Development Department (E+D). Climatology Senior Technician since 2008.
Other interests	

Meteorology Lecturer 2	Jose Antonio Parodi Perdomo		
Department	Meteorology		
Area of expertise	Atmosphere Physics. Meteorology and Climatology		
Office location	AEMET territorial delegation in Murcia		
Phone	968834404	Fax	968830423
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URL / WEB			
Office hours (for supervisions)	TBD 2013-2014		



Office hours location (for supervisions)	Virtual Classroom
Academic and Research Profile	<ul style="list-style-type: none"> * Meteorologist * M.Sc. on Climatic Risks and Environmental Impact. INM-Univ. Complutense Madrid. * European Research Projects (collaborator): HIRLAM, Rhone-AGG, ELDAS. ENSEMBLES. EC-EARTH * Development of surface scheme ISBA-HIRLAM
Academic Background	<ul style="list-style-type: none"> * Spanish Airforce Academy. Aeronautical Meteorology (internal promotion) academic year 2012-2013. * AEMET. Internal courses (coordination and teaching).
Research Lines	<ul style="list-style-type: none"> * R&D Department. AEMET Territorial Delegation in Murcia. * Collaborator. Climate evaluation and modeling Area within the Department of Developments and Applications of the AEMET (Central Services). * Participant. Project EC-EARTH – climatic model of the Earth (last generation climatic models)
Professional Background	<ul style="list-style-type: none"> * Superior Technician. Project ELDAS. AEMET (SS.CC.) Madrid. 2003-2004 * Superior Technician. Project ENSEMBLES. AEMET (SS.CC.) Madrid. 2005-2006 * Meteorology Superior Technician. Delegación de AEMET en la Región de Murcia. Unidad de Estudios y Desarrollos (E+D) from 2007.
Other interests	

Meteorology Lecturer 3	Luis María Bañón Peregrín		
Department	Meteorology		
Area of expertise	Atmosphere Physics. Meteorology and Climatology		
Office location	AEMET territorial delegation in Murcia		
Phone	968834404	Fax	968834404
E-mail	lbanonp@aemet.es		
URL / WEB			
Office hours (for supervisions)	TBD 2013-2014		
Office hours location (for supervisions)	Virtual classroom		
Academic and Research Profile	<ul style="list-style-type: none"> * Meteorologist * Postgraduate grants advisor. 		



Academic Background	<ul style="list-style-type: none"> * Lecturer at "Spanish American course on Satellite Meteorology". Editions from V to IX (2008 to 2012). * Spanish Airforce Academy. Aeronautical Meteorology (2nd course CGSO and 1st course CGO) academic year 2011-2012; Aeronautical Meteorology (Promoción Interna) academic year 2012-2013. * AEMET. Internal courses teaching.
Research Lines	<ul style="list-style-type: none"> * Postgraduate grant advisor. * Activity Nowcasting EUMETNET. Leader of the Nowcasting systems and techniques working area.
Professional Background	<ul style="list-style-type: none"> * Meteorological Observer. 2 years. * Forecaster at the Meteorological Office in San Javier. 10 years. * Meteorology Superior Technician. Delegación de AEMET en la Región de Murcia. 8 years. * Delegación de AEMET en la Región de Murcia. Studies and Developments Unit. Chief. 1 year.
Other interests	

Phraseology Lecturer	Major William Morse		
Department	Vuelos, Escuela Elemental		
Area of expertise	Instrument and visual flight, civil and tactical aviation communications		
Office location	Escuela Elemental		
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Office hours (for supervisions)	19:00 to 20:00 class days		
Office hours location (for supervisions)	TBD 2013-2014		
Academic and Research Profile	Military aviation and international relations		
Academic Background	2002 Bachelor's degree, Management Information Systems, University of Utah 2004 Undergraduate Pilot Training, Columbus AFB, MS, United States Air Force 2008 Squadron Officer School, Maxwell AFB, AL, United States Air Force 2009 Advance Instrument School, Oklahoma City, OK, Air Force Standards Agency 2010 Master's Degree, International Relations – Latin America, Troy University 2011 Flight and Academic Instructor, Academia		



	General del Aire
Research Lines	NextGen Air Traffic Control System Aviation safety
Professional Background	Evaluator Pilot with 2600 flight hours/ 300 combat flight hours Multiengine qualified Instrument qualified 2x Red Flag Exercise Participant Cope Thunder Exercise Participant Cope North Exercise Participant
Other interests	

3. Course Outline

3.1. Presentation

The special features of the Centro Universitario de la Defensa (CUD) placed at the Spanish Air Force Academy (AGA) make it necessary to complement the curriculum of the Organization Engineering Degree with specific courses related to aeronautics. This is due to the environment where the former students will develop their immediate professional activity.

The course "Meteorology and Communications Phraseology" is a compulsory subject within the academic conception of the curriculum. This course is offered to cover the blocks 050 and 090 of the theoretical knowledge requirements for Flight Crew Licenses, according to Joint Aviation Authorities (JAR-FCL 1.470). During the previous three years, the student has acquired the theoretical and practical tools to undertake the study of the Meteorology subject from a quantitative and practical point of view. Additionally, during those three years the students have attended to several courses on English language, knowing the grammatical rules and technological vocabulary. In this course, the special features of the aeronautical jargon and the communications pilot – control are widely studied.

3.2. Year and duration within the degree programme

The subject "Meteorology and Communications Phraseology" is offered during the **Fourth** Year of the Industrial Organization Engineering Degree.

3.3. Description of the course

Meteorology.

In this course the most important meteorological factors for the flight navigation are presented. To do that, the course is divided into 3 blocks. The first one the physical laws that govern these phenomena are presented. Then, the adverse meteorological phenomena (storms, turbulence and visibility) and their hazards for the flight navigation are explained. Finally a summary of the main Meteorological Information Systems is given (aeronautical keys, maps, satellites, numerical models), the knowledge of this system is a key feature for the right flight planning.

Communications Phraseology

The course will focus on standard radio calls used in various phases of flight. Additionally, emphasis will be placed on vocabulary and abbreviations found in flight related publications.

3.4. Related courses. Prerequisites and recommendations.

To successfully face the course, students should have knowledge of the following subjects:

- Fluid Mechanics (2nd year): pressure, density, state equation, simplified atmospheric models.
- Energetic Technology (2nd year): thermodynamics and heat transfer.



- Environmental Technology (2nd year): atmosphere definition and structure.
- Fundamentals of Flight (3rd year): ISA, atmospheric effects on aerodynamics and aircraft performances.
- English I (1st year): English Language fundamentals (B2 level)
- Technological English II (3rd year): aeronautical and military vocabulary.

3.5. Special measures

Special measures will be adopted to allow the simultaneity of the course with military and aeronautics training activities. Specifically, working groups will be formed to promote the cooperative learning, promoting the learning track by scheduled tutorships and continuous assessments delivery.



4. Competences

4.1. Specific competences of the course

Appropriate knowledge of the atmosphere and its phenomena and its effects on aircrafts. Aeronautical English application to flight practices.

4.2. Generic and transversal competences

INSTRUMENTAL COMPETENCES

- ☒ T1.1 Analytical and summary skills
- ☒ T1.3 Oral and written communication skills in their mother tongue
- ☒ T1.4 Oral and written communication skills in foreign language

PERSONAL COMPETENCES

- ☒ T2.2 Teamwork

SYSTEMIC COMPETENCES

- ☒ T3.1 Ability to apply theory to practice
- ☒ T3.2 Learning ability
- ☒ T3.3 Adaptation to new situations
- ☒ T3.7 Ability to work autonomously

4.3. General aims/ Degree specific competences

PROFESSIONAL COMPETENCES

- ☒ E1.4 Knowledge about applied engineering and aircraft systems, aerospace vehicles, installations and related systems operation.

4.4. Learning objectives

At the end of the course, the student should be able:

- To identify the most adverse meteorological phenomena a pilot can face while planning a flight route, using the Meteorological Information Systems.
- To understand the main physical processes that lead to those phenomena.
- To understand calls and abbreviations related to the flight.
- To communicate intentions and orders between pilots and air traffic controllers
- To identify abbreviations and requirements for the documents needed to prepare visual and instrumental flights.



5. Contents

5.1. Contents according to the Degree programme

Atmosphere. Temperature, pressure, density, moisture. Cloud generation and rain. Jets streams, shear and storms. Aeronautical Communications Standards (VFR and IFR) in English language.

5.2. Lectures programme

PART I. METEOROLOGY

D.U. 1. GENERAL METEOROLOGY

Lesson 1. Introduction to meteorology.

Lesson 2. Density.

Lesson 3. Temperature and moisture.

Lesson 4. Wind.

Lesson 5. Static stability and adiabatic processes.

Lesson 6. Visibility.

Lesson 7. Cloudiness.

Lesson 8. Pressure systems.

Lesson 9. Rainfalls.

D.U. 2. METEOROLOGY APPLIED TO FLIGHT

Lesson 10. Air masses and fronts.

Lesson 11. Turbulence.

Lesson 12. Storms.

Lesson 13. Icing.

Lesson 14. Climatology

Lesson 15. Meteorological Information Services.

Lesson 16. Teledetection.

Lesson 17. Numerical models and weather prediction.

PART II. COMMUNICATIONS PHRASEOLOGY

D.U. 3. STANDARD COMUNICACIONES

Lesson 18. Departure Information

Lesson 19. Taxi and Take-off

Lesson 20. Standard VFR (uncontrolled field) pattern calls

Lesson 21. Departure and Cruise

Lesson 22. Descent and Approach

Lesson 23. Transition to Tower, Landing and After Landing

D.U.4. FAIL CASE ACTIONS

Lesson 24. Traffic alerts, NORDDO, and other Emergencies

D.U.5. COMUNICACIONES AVIATION SAFETY CASE STUDIES

Lesson 25. Case study. Los Rodeos

Lesson 26. Case study. Providence Rhode Island Runway Incursion



5.3. Classes/Seminars/practicals/tutorials programme

Meteorology:

No specific sessions at laboratories or multimedia classroom will be taken. During the theoretical lectures, the lecturer will develop practical exercises to fix the theoretical concepts.

Phraseology. Multimedia classroom.

For a better practice of the communication procedures between pilot and control, the multimedia classroom will be used for real communications listening sessions and simulated speaking sessions.



6. Teaching methodology

6.1. Learning activities			
Activity	Lecturer role	Student role	ECTS
Lectures	Explanation of the subject and following of students' acquisition and application. Doubts solution. Special attention on fundamental and most complex aspects will be made.	<u>Attendance</u> : attendance to classes and participation. Notes taking. Questions.	1.1
		<u>Non-attendance</u> : individual subject study.	1.43
Classes	Typical problems resolution and practical cases study with teacher assistance.	<u>Attendance</u> : active attendance. Questions and problems resolution.	0.26
		<u>Non-attendance</u> : individual subject study. Proposed problems resolution.	0.5
Practicals (multimedia classroom)	Explanation, manage and direction of multimedia classroom.	<u>Attendance</u> : Active participation. Notes taking. Questions and practice performance.	0.44
Continuous assessment	Short theoretical-practical questions will be given to the student to be solved in the classroom (or virtual classroom) as a technique to monitor the learning process.	<u>Attendance</u> : Theoretical-practical problems solution.	0.04
Workout for oral presentation	Proposals of the workout options and guidance through documentation to develop the work. Evaluation of the oral presentations.	<u>Attendance</u> : Oral presentation and answer to questions.	0.01
		<u>Non-attendance</u> : Individually: material selection and understanding. Oral exposition trials. Groupally: aesthetic and contents coherence of the presentation must be obtained	0.5
Supervisions and group tutorials	Proposed problems revision and students' doubts resolution.	<u>Attendance</u> : Face theoretical and practical doubts.	0.08
		<u>Non-attendance</u> : Theoretical and practical doubts via e-mail and virtual classroom.	
Course assessment	An individual, partial written examination about the first part of the course will take place at the middle of the term. At the end of the term, a final individual written examination will be done.	<u>Attendance</u> : Written assessment attendance and solution.	0.14
TOTAL			4.50



7. Assessment

7.1. Assessment system				
	Técnicas	Realización / criterios	Ponderación	Competencias genéricas
METEOROL GY ⁽¹⁾	Individual Written Assessment (100% Meteorology)	Test: <ul style="list-style-type: none"> - 50 questions (approx) - 4 options per question with only 1 right answer - 4 wrong answers deduct 1 right answer - 50% to pass 	Only 1 test per call	T1.1, T1.3, T1.4, T3.1, T3.2, T3.3, T3.7
	Individual Written Assessment (75% Phraseology) ⁽³⁾	Test: <ul style="list-style-type: none"> - 55 questions - 75% right questions to pass 	Only 1 test per call	T1.1, T1.4, T3.1, T3.2, T3.3, T3.7
PHRASEOLOGY ⁽²⁾	Continuous Assessment (5% Phraseology)	Eventually problems or questions will be given to evaluate the student continuous learning.	Defined by the lecturer according to the difficulty and contents of different proposals	T1.1, T1.4, T3.2, T3.7
	Oral Presentation (20 % Phraseology)	Exposition of a workout about a flight security incident or an own experience. The student must explain the main causes and the lessons related to the exposition	Only 1 presentation per course	T1.1, T1.4, T2.2, T3.1, T3.3, T3.7
<p>COMENTARIOS:</p> <p>(1) Only 1 Individual Written Assessment on Meteorology will be taken. The numerical mark of this part (MET) will be normalized to 0-10 scale. Complementary details can be given at the specif call of the Written Assessment.</p> <p>(2) The Phraseology part mark (FRA) will be calculated based on the weighting factors collected at the table.</p> <p>(3) The Individual Written Assessment on Phraseology will be divided into 3 parts:</p> <ul style="list-style-type: none"> o Part 1 → 11 listening questions. o Part 2 → Matching questions o Part 3 → Multiple Choice questions <p>The listening questions will have a higher weight than the multiple choice questions, and the multiple choice questions will have a higher weight than the matching questions.</p> <p>- To pass the course both parts must be passed (separately):</p> <ul style="list-style-type: none"> o Meteorology mark: MET ≥ 5.0 (based on a 0-10 scale) o Phraseology mark : FRA ≥ 5.0 (based on a 0-10 scale) <p>- The course mark is calculated according to the temporal distribution of the parts:</p> $\text{Course} = \frac{2}{3}\text{MET} + \frac{1}{3}\text{FRA}$				



7.2. Learning process monitoring

Monitoring will be done by some of the following mechanisms:

- Proposed class questions and cooperative learning activities (with problems).
- Monitoring and review of the proposed problems.
- Individual tutorials.
- Monitoring of the student activities.
- Individual partial written tests throughout the course.



8. Results, learning activities and assessment

8.1. Objetivos del aprendizaje / actividades formativas / evaluación de los resultados							
Learning objectives (4.4)	Clases de teoría	Clase de problemas	Clase de prácticas	Evaluación formativa	Tutorías	Exposiciones orales	Pruebas escritas individuales
To identify the most adverse meteorological phenomena a pilot can face while planning a flight route, using the Meteorological Information Systems.							
To understand the main physical processes that lead to those phenomena.							
To understand calls and abbreviations related to the flight.							
To communicate intentions and orders between pilots and air traffic controllers							
To identify abbreviations and requirements for the documents needed to prepare visual and instrumental flights.							

9. ECTS Allocation

COURSE		ATTENDANCE		CONVENTIONAL ATTENDANCE		NON-CONVENTIONAL ATTENDANCE		NON-ATTENDANCE	
CREDITS	TOTAL HOURS	AC	AH	CAC	CAH	NCAC	NCAH	NAC	NAH
4.5	112.5	2.07	51.75	1.8	45	0.27	6.75	2.43	60.75

AC: ATTENDANCE CREDITS

CAC: CONVENTIONAL ATTENDANCE CREDITS

NCAC: NON-CONVENTIONAL ATTENDANCE CREDITS

NAC: NON-ATTENDANCE CREDITS

AH: ATTENDANCE HOURS

CAH: CONVENTIONAL ATTENDANCE HOURS

NCAH: NON-CONVENTIONAL ATTENDANCE HOURS

NAH: NON-ATTENDANCE HOURS



10. SCHEDULE

			Attendance Activities						Non Attendance Activities				
			Conventional			Non conventional							
Begin week- end week	Didactic Unit	Lesson	Lectures	Classes	Practicals (multimedia)	Continuous Assessment	Tutorials	Assessment	Personal Study	Works preparaiton	Cooperative Workout	TOTAL HOUR	
S1-S1	UD1	L1	1				0.5		1			2	30
S1-S1		L2	1						1			2	
S1-S2		L3	1.5	0.5					2			4	
S2-S2		L4	1.5	0.5					2			4	
S3-S3		L5	2	1					3.5			6.5	
S4-S4		L6	1						1.5			2.5	
S4-S4		L7	1						1.5			2.5	
S4-S5		L8	1.5	0.5					2.25			4.25	
S5-S5		L9	1						1			2	
S5-S6	UD2	L10	1.5	0.5			0.5		2.5			4.5	39
S6-S6		L11	1.5	0.5					2.5			4.5	
S7-S7		L12	1						1			2	
S7-S7		L13	1.5	0.5					2.5			4.5	
S8-S8		L14	1.5	0.5					2.5			4.5	
S8-S9		L15	2	1					4.5			7.5	
S9-S10		L16	1.5	0.5					2.5			4.5	
S10-S10		L17	1.5	0.5				1.5	3			6.5	
S11-S11	UD3	L18	0.5		1		0.5		1.5			3	21
S11-S12		L19	0.5		1.5				1.5			3.5	
S12-S12		L20	0.5		1	0.25			1.5			3.25	
S12-S13		L21	0.5		1.5				1.5			3.5	
S13-S13		L22	0.5		1.5				1.5			3.5	
S13-S14		L23	0.5		1	0.25			1.5			3.25	
S14-S15	UD4	L24	0.5		2	0.3	0.5		1.5			4.3	4
S15-S15	UD5	L25	0.3		0.7	0.1			0.5			1.6	4
S15-S15		L26	0.3		0.7	0.1			0.5			1.6	
Written Assessments								2					2
Oral Presentations								0.25		7.5	5		13
Total hours			27.6	6.5	10.9	1.0	2	3.75	48.25	7.5	5		112.5

11. BIBLIOGRAPHY

Meteorology:

- Meteorology. Edit: Jeppesen. ISBN: 0-88487-451-6
- An introduction to dynamic Meteorology. JR. Holton. Edit: Elsevier Academic Press. ISBN: 0-12-354015-1
- Mesoscale Meteorology in Midlatitudes. P.Markowski y Y. Richardson. Edit: John Wiley & Sons. ISBN: 978-0-470-74213-6
- Meteorología Aeronáutica. B. González. Edit: AVA. ISBN: 84-933720-3-X
- Meteorología aplicada a la aviación. M. Ledesma y G. Baleirola. Edit: Paraninfo. ISBN: 84-283-2840-4

Communications Phraseology:

- Communications. Oxford Aviation Training 2nd Edition. Edit: Jeppesen.
- Air Speak: Radiotelephony Communication for Pilots
 - o Air Speak Radio Recordings

