

# ESTONIAN AVIATION ACADEMY

<b>I. GENERAL</b>	
COURSE CODE AND TITLE: (in English and Estonian)	Õhusõiduki ehitus inglise keeles AM.C.004 <i>Aircraft Construction in English</i>
COURSE IS OFFERED:	2017/2018 fall semester
COURSE IS FOR:	Undergraduate Majors of Aircraft Engineering (118817)
CREDITS (ECTS):	4
GRADE OPTION:	Pass/Fail
COURSE TIMEFRAME:	Contact hours: 60 (in classroom), individual work: 44 hrs
LANGUAGE OF INSTRUCTION:	English
PREREQUISITES FOR ENROLMENT:	Students willing to take this course are recommended to have completed the Technical English course (for sophomores majoring in Aircraft Engineering at EAVA), or other equivalent course(s) if studied somewhere else
INSTRUCTOR(s):	John Hans Kunka
<b>II. COURSE OBJECTIVES (WITH THEIR OVERT OUTCOMES) AND DESCRIPTION</b>	
COURSE OBJECTIVES (WITH THEIR OVERT OUTCOMES):	<ol style="list-style-type: none"> <li>(1) To learn about aircraft structures, using English as a working language;</li> <li>(2) Alongside learning about the structures, to acquire the relevant terms and their use in collocations/context;</li> <li>(3) Through the assignments for consolidating the material(s), prepare for upcoming internships and the capstone course in year 4.</li> </ol>
COURSE DESCRIPTION (in brief):	This course focuses on studying several structures of aircraft and learning the pertinent terminology, with expanding of students' lexical/terminological competency in mind. The instruments used for that, include: working with texts, doing practical assignments needed for acquiring information and retention of terms. Videos will also be shown to generate topic-related virtual settings that shall help to facilitate discussion and, thereby, consolidate the material being studied. Search of supplementary/detailed information about the items discussed, followed by short presentations + discussion in each class, will make up the bulk of students' individual work.
<b>III. COURSE OUTLINE</b>	
Week of	Topic
Sep 5	Major structural stresses; Fuselage (Truss type, Monocoque type, Semimonocoque type), Pressurization
Sep 12	Wings, (wing configurations, wing structure, wing spars, wing ribs, wing skin); Nacelles.

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Sep 19	Empennage; Primary flight control surfaces (ailerons, elevator, rudder); secondary or auxiliary control surfaces (flaps, slats, spoilers and speed brakes; tabs; other wing features).
Sep 26	...continued from previous week. Exam 1: based on knowledge of aircraft fuselage, empennage and wings structures
Oct 3	Reciprocating engines: design and construction; crankcase sections; crankshaft balance; connecting rods and pistons (incl. piston rings: compression ring; oil control rings; oil scraper ring).
Oct 10	Cylinders: cylinder heads; cylinder barrels; cylinder numbering (+ firing order). Valve structure and operating mechanism (incl. cam rings, camshaft, tappet assembly: solid lifters / tappets, hydraulic valve tappets / lifters, push rods, rocker arms, valve springs).
Oct 17	Operating cycles: Four-stroke cycle (intake stroke; compression stroke; power stroke; exhaust stroke). Starting with Reciprocating engine power and efficiencies... (t.b.c. in week of Oct 24)
Oct 24	Continued from week of Oct 17: Reciprocating engine power and efficiencies: work; horsepower; piston displacement; compression ratio; indicated horsepower; brake horsepower; friction horsepower.
Oct 31	Gas turbine engine: types and structure; air entrance; accessory section; compressor section (incl. compressor types: centrifugal-flow compressors and axial-flow compressors); diffuser; combustion section; turbine section; exhaust section) Continued in week of Nov 7.
Nov 7	Continued from week of Oct 31
Nov 14	Turboprop engines, turboshaft engines; and turbofan engines. Turbine engine operating principles: thrust; gas turbine engine performance.
Nov 21	Exam 2: based on knowledge of reciprocal engines, gas turbine engines; turboprop, turbofan and turbo-shaft engines (their structures and principles of work).
Nov 28	Landing gear types and landing gear arrangement: tail wheel-type landing gear; tandem landing gear; tricycle-type landing gear; fixed and retractable landing gear. Shock absorbing and non-shock absorbing landing gear.
Dec 5	Shock struts: shock strut operation; servicing shock struts; bleeding shock struts. Nose wheel steering systems: in small aircraft; in large aircraft. Shimmy dampers; Steering tamper.
Dec 12	Landing gear alignment, support and retraction: small aircraft retraction systems; large aircraft retraction systems; emergency extraction systems. Landing gear safety devices: Safety switch; ground locks; alignment; landing gear position indicators; nose wheel centering.
Dec 19	Exam 3 on Landing gear and shock struts. The course wraps up.

### IV. COURSE TEXTS

#### PRIMARY:

- Aviation Maintenance Technician's Handbook, FAA, 2012;
- David Morgan and Nicolas Regan, Take-Off. Technical English for Engineers. Garnet, 2013.

SUPPLEMENTARY: Lufthansa Technical Training materials

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<b>V. GRADING PLAN</b>	
<b>GRADED COURSE ACTIVITIES</b>	<b>PERCENTAGE OF TOTAL 100</b>
Exam 1	25 %
Exam 2	25 %
Exam 3	25 %
Class participation and presentations	25 %