**UMO for the profile " Aviation equipment»**

**external resources of specialty 1310000 " Technical operation of transport radio-electronic equipment (air transport)»**

**Qualification: Electrical technician; radar, radio navigation and communication Technician**

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| **№ п/п** | **Discipline** | **Topic** | **External resources** | |
| **video lesson** | **Additional materia** |
| **1** | Electrical engineering | 1. DC Electric machines. Generators with sequential and mixed excitations  2. Generator with external excitation  3. Basics of electric drive.Concepts of electric drive, types of electric drive  4. Air transport automatic electric drive systems  5. Basics of electric drive.Sensors  6. Basics of electric drive.General information about air transport systems  7. Relay-contactor control of electric motors  8. Transmission and distribution of electric energy | 1.YouTube  <https://www.youtube.com/watch?v=rUlpHdDarIg> | Г.В.Ярочкина  <https://www.twirpx.com/file/89296/>  В.М.Прошин  <https://www.twirpx.com/file/1751576/>  В.В.Москоленко  <http://bamper.info/582-v_v_moskalenko_elektriceskij_privod_ucebnik_dl.html>  П.А.Бутырин  <https://www.studmed.ru/butyrin-pa-elektrotehnika-kniga-1_ae1ebdb5120.html>  П.Н.Новиков  <https://obuchalka.org/> |
| **2** | Fundamentals of electrical engineering | 1. Electrical measurements. Measurement of power and electricity.  2. single-Phase induction electricity meter  3. single-Phase AC electrical circuits. Circuits with active and reactive resistances  4. Single-phase electric AC circuit. Current and voltage resonance  5. Serial and parallel AC circuits. The stress response  6.A parallel circuit of alternating current. A resonance of currents. Ac power  7. single-Phase magnetic amplifier  8. three-Phase electrical circuits. Star connection  9. three-Phase electrical circuits. The connection triangle  10. Connecting the windings of the three-phase current generator " Star»  11. Connecting the windings of the three-phase current generator " Triangle»  12. Transformers. Device and principle of operation of the transformer. Modes of operation of the transformer.  13. three-Phase transformers. Air transport transformer. Instrument transformer  14. Study the principle of operation of a transformer magnetic amplifier  The system of power plants  Automatic pressure control system (SARD)and air conditioning system (SKV). |  |  | |
| **3** | Design and functional systems of the LA | The system of power plants | <https://www.youtube.com/results?search_query> | 1.Презентация по электротехнике  <http://www.myshared.ru/theme/elektrotehnika>  2.Тесты по электротехнике  <https://pandia.ru>  3.Лекции  <https://www.youtube.com/watch?v=-NKZNUUzR-Q&list=PLfS9QQiUmfJZCTZtjIZasiz7RWwUD4rx> |
| **4** | Design and functional systems of the LA | Automatic pressure control system (SARD)and air conditioning system (SKV). | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| **5** | Design and functional systems of the LA | Topic.  Anti-icing system (POS). | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| **6** | Design and functional systems of the LA | Fundamentals of engine theory. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| **7** | Design and functional systems of the LA | The main elements of engine design. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| **8** | Design and functional systems of the LA | Basic design and operation of gas turbine engines | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 9 | Labor protection and environmental fundamentals | Ecosystem properties. | <https://www.youtube.com/watch?v=k0AkT_Brc20> | <https://ppt-online.org/164262> |
| 10 | Labor protection and environmental fundamentals | Environmental protection | <https://www.youtube.com/watch?v=y7Op--1Pr0k> | <http://www.myshared.ru/slide/1060776/> |
| 11 | Fundamentals of standardization Metrology and certification | Procedure for obtaining a certificate of maintenance and repair of aircraft equipment. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 12 | Fundamentals of standardization Metrology and certification | The rights and obligations of participants of certification. Certification scheme. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 13 | Fundamentals of standardization Metrology and certification | Introduction. Law of the Republic of Kazakhstan " on ensuring the uniformity of measurements» | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 14 | Fundamentals of standardization Metrology and certification | Values. Classification of quantities | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 15 | Fundamentals of standardization Metrology and certification | Errors. Classification of errors | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 16 | Fundamentals of standardization Metrology and certification | Measurements. Measurement method | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 17 | Fundamentals of standardization Metrology and certification | Measuring signal | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 18 | Fundamentals of standardization Metrology and certification | Means of measurement | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 19 | Fundamentals of standardization Metrology and certification | Accuracy class of the measuring instrument | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 20 | Fundamentals of standardization Metrology and certification | Verification and calibration of the measuring instrument | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 21 | Fundamentals of standardization Metrology and certification | Tools for studying parameters and waveforms | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 22 | Fundamentals of standardization Metrology and certification | Stages of standardization, principles and methods of standardization | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 23 | Fundamentals of standardization Metrology and certification | Basic information about product quality | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 24 | Fundamentals of standardization Metrology and certification | International organization for Standardization ISO. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 25 | Fundamentals of standardization Metrology and certification | International civil aviation organization ICAO.. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 26 | Fundamentals of standardization Metrology and certification | International air transport Association IATA | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 27 | Fundamentals of standardization Metrology and certification | Organization activity.. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 28 | Fundamentals of standardization Metrology and certification | Goals and objectives of organizations. Organization codes | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 29 | Fundamentals of standardization Metrology and certification | Standard of organization. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 30 | Fundamentals of standardization Metrology and certification | The essence and content of certification | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 31 | Fundamentals of standardization Metrology and certification | The concept of certification. | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 32 | Fundamentals of standardization Metrology and certification | Rights and obligations of certification participants | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 33 | Fundamentals of standardization Metrology and certification | Certification scheme | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 34 | Fundamentals of standardization Metrology and certification | The procedure of certification of products | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 35 | Technical drawing | Images-views, sections, sections | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 36 | Technical drawing | Threaded connection | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 37 | Technical drawing | Part sketch | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 38 | Technical drawing | Axonometry | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 39 | Technical drawing | Detailing an Assembly drawing | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?clid> |
| 40 | Technical drawing | Introduction to the AutoCAD interface, COMPASS-3D | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 41 | Technical drawing | Drawing and editing commands for drawings | <https://www.youtube.com/results?search_query> | <https://yandex.kz/search/?tex>t |
| 42 | LA and AD design | Information about GTD  Input device.  Compressors.  Combustion chamber.  Turbine.  Output device.  Reverse.  Control devices of the engine.  Electronic engine control system (SAU)..  Engine activation system. |  | <https://cloud.mail.ru/public/2h8t/c1J86QAbt> |
| 43 | Electrical engineering | Power and operation of electric current | 1.YouTubе  <https://www.youtube.com/watch?v=rUlpHdDarIg> | Г.В.Ярочкина  <https://www.twirpx.com/file/89296/>  П.А.Бутырин  <https://www.studmed.ru/butyrin-pa-elektrotehnika-kniga-1_ae1ebdb5120.html> |
| 44 | Electrical engineering | 1. Electrical engineering  The electric field  2. DC Electrical circuits. ohm's law  3. Serial connection resistance  4. DC Electrical circuits. Kirchhoff's Laws  5. Parallel and mixed resistance connection  6. Operation and power of electric current | 1.YouTubе  <https://www.youtube.com/watch?v=rUlpHdDarIg> | Г.В.Ярочкина  <https://www.twirpx.com/file/89296/>  В.М.Прошин  <https://www.twirpx.com/file/1751576/>  В.В.Москоленко  <http://bamper.info/582-v_v_moskalenko_elektriceskij_privod_ucebnik_dl.html>  П.А.Бутырин  <https://www.studmed.ru/butyrin-pa-elektrotehnika-kniga-1_ae1ebdb5120.html>  П.Н.Новиков  <https://obuchalka.org>  1.Презентация по электротехнике  <http://www.myshared.ru/theme/elektrotehnika>  2.Тесты по электротехнике  <https://pandia.ru>  43.Лекции  <https://www.youtube.com/watch?v=-NKZNUUzR-Q&list=PLfS9QQiUmfJZCTZtjIZasiz7RWwUD4rx> |
| 45 |  | IV-41AM vibration monitoring equipment. Purpose, set, and principle of operation, preflight check.  IV-300 vibration monitoring equipment Purpose, set, and principle of operation, preflight check. (Module 13.8)  Remote induction nano-meter dim -240, 2DIM-240, 2DIM-150. Pressure gauge MV-10M, MV-125M.  Thermometer TV-45, TV-19T, TUE-48K, TNV-15, Thermometer 2TUE-111 (Module 13.8)  Indicator of the level of hydrosoil me -1866. Position indicator of the flaps UZP-47 and UP11-09, position Indicator of the stabilizer UP11 -10  Accelerometer ADP -4, air Flowmeter URVK-18, height and pressure drop Indicator UVPD-5-0.8 K, and air transportomat angles of attack and overload AUSP-14KR,  Topic 3.4. altitude speed and overload Recorder K3-63, flight mode registration system MSRP-12-96, (Module 13.8) Topic 3.5. Oxygen equipment . Oxygen device KP -21, oxygen device KP-24M, pressure gauge MK-60K, pre-flight check, warning, portable oxygen equipment, charging of oxygen systems. |  | <https://drive.google.com/open?id=1JTcz4XbdzHJ7VwyaER9uR2DrYOJ2pUu5>  <https://drive.google.com/open?id=1VDvjynkSH6PC-WiDyxF0s8rQpB25M_lK> <https://drive.google.com/open?id=1nDvMAic4c8mGFzC0F9bhSD1PFN4m-dqV> <https://drive.google.com/open?id=1FCHma3CUugLMWDWCgUkxT5g_ohg2TA57> <https://drive.google.com/open?id=1icLS7WM_fvhgeiqgCLkHYg9E_82KWN6c> [https://drive.google.com/open?id=1PBS8pvS7nIQwsS37ZSMHmVUNm jf6](https://drive.google.com/open?id=1PBS8pvS7nIQwsS37ZSMHmVUNm%20jf6)  <https://drive.google.com/open?id=1aBj9D_1G36dYHQ_pIhIEr5SgU2UzyT_f>  <https://drive.google.com/open?id=1Gge_C8j2fgCXXzxuqR_1Xjup-ro6tTon> |
| 46 | Electronics and digital microprocessor technology | Varieties of semiconductor diodes.  Bipolar transistor. Structure, principle of action, physical processes  Bipolar transistor. Enabling BT according to the scheme with OE, OB and common collector (OK)  Bipolar transistor. Analysis of the cascade transistor | <https://www.youtube.com/watch?v=H59Qi5_mVYA>  <https://www.youtube.com/watch?v=8n6pZZbCP8w>  <https://www.youtube.com/watch?v=zlOYcJJ3jBo>  <https://www.youtube.com/watch?v=8lwUnqsYT6Q> | <http://padabum.com/d.php?id=178606>  <http://padabum.com/d.php?id=178606>  <http://padabum.com/d.php?id=178606>  <http://padabum.com/d.php?id=178606> |
| 47 | Electronics and digital microprocessor technology | Varieties of semiconductor diodes  Bipolar transistor. Structure, principle of action, physical processes  Bipolar transistor. Enabling BT according to the scheme with OE, OB and common collector (OK)  Bipolar transistor. Analysis of the cascade transistor |  | <http://padabum.com/d.php?id=178606> |
| 48 | Fundamentals of electronics and digital microprocessor technology | 1. Physical basis of semiconductor devices. Types of transition breakdown  2. Semiconductor diodes. Definition and classification  3. Semiconductor diodes. Rectifier diode  4. Semiconductor diodes. Pulse diodes  5. Varieties of semiconductor diodes. Semiconductor Zener diodes  6. Varieties of semiconductor diodes. Led, photodiode. Schottky diode  7. Bipolar transistors. Structure, principle of operation, physical processes  8. Bipolar transistors. BT operating modes  9. Bipolar transistors. Enabling BT according to the scheme with OE, OB and common collector (OK)  10. Bipolar transistors. Nonlinear low-frequency BT model  11.Bipolar transistor. Analysis of the cascade transistor | <https://classroom.google.com/c/NTY5NjA5Njg4Nzha> | 1.<https://www.youtube.com/watch?v=pYGib43HU88>  2. <https://www.youtube.com/watch?v=H59Qi5_mVYA&t=904s>  3. <https://www.youtube.com/watch?v=CsbetxZn0I4>  4.<https://www.youtube.com/watch?v=CsbetxZn0I4>  5. <https://www.youtube.com/watch?v=gzZdJQAFPk0>  6.<https://www.youtube.com/watch?v=AMbFMlLUpH8>  7. <https://www.youtube.com/watch?v=X3rDIP7vAMk>  8.<https://www.youtube.com/watch?v=H59Qi5_mVYA>  9.<https://www.youtube.com/watch?v=8n6pZZbCP8w>  10.<https://www.youtube.com/watch?v=zlOYcJJ3jBo>  11.<https://www.youtube.com/watch?v=8lwUnqsYT6Q>  12.<https://www.youtube.com/watch?v=8n6pZZbCP8w>  <http://padabum.com/d.php?id=178606> |
| 49 | Fundamentals of electronics and digital microprocessor technology | 1. operation mode of a bipolar transistor  2. connecting the OE, OB and OK to the bipolar transistor circuit  3. analysis of the transistor stage |  | <https://www.youtube.com/watch?v=zlOYcJJ3jBo>  <https://www.youtube.com/watch?v=8lwUnqsYT6Q>  <https://www.youtube.com/watch?v=QVyxyEGO40A>  <http://padabum.com/d.php?id=178606> |
| 50 | The basics of analog-to-discrete circuitry | Power supply for radio electronic devices  Smoothing and stabilization | <https://www.youtube.com/watch?v=uoihUuJIevA> | <https://www.sibsau.ru/sveden/edufiles/131689/> |
| 51 | Automation and control | 1.Mathematical description of the automated control system, transfer functions of typical units of the automated control system У | <https://www.youtube.com/watch?v=hXNBjvIDjw0> |  |
| 52 | Electrical measurement | 1.Measuring the generators of low frequencies  2. Electronic oscilloscope  3. Cathode ray tubes  4 Technique of oscillographic measurements  5. measurement of amplitude-frequency characteristics  6. Air-to-air transportatization of oscillographic measurements. | 1.<https://.www.youtube.com/watch?v=J1AevGtpD3w>  2.<https://www.youtube.com/watch?v=6rfiLuT5FVs>  3.<https://www.youtube.com/watch?v=Kt1vJ8M_25Y>  4.<https://www.youtube.com/watch?v=bAg7YkgrXKA>  5.<https://www.youtube.com/watch?v=IJz7sS-eRa0>  6.<https://www.youtube.com/watch?v=lclXJt55Md0> |  |
| 53 | Automation and control | 1. Synthesis of nonlinear control laws  2. Synthesis of nonlinear control laws  3. Absolute stability in nonlinear control systems  4. Absolute stability in nonlinear control systems  5. Absolute stability in nonlinear control systems  6. Synthesis of optimal control laws  7. Synthesis of optimal control laws  8. Synthesis of optimal control laws  9. Digital automated control systems  10. Digital automated control systems | 1. <https://www.youtube.com/watch?v=deqAriXeKzg>   2.<https://www.youtube.com/watch?v=Y_VnQNr2M34&list=PLZ1a65qpBFyaeq9ENS9hW4QQYz5m7_gS6&index=147>  3.<https://www.youtube.com/watch?v=JAMbALXeKXQ>  4.<https://www.youtube.com/watch?v=Ej7vScjCDjI>  5.<https://www.youtube.com/watch?v=LVFeLoGfheA>  6.<https://www.youtube.com/watch?v=TKiANnwecd4>  7.<https://www.youtube.com/watch?v=16w9T8okAjs>  8.<https://www.youtube.com/watch?v=VQeHHl5raiw>  9.<https://www.youtube.com/watch?v=K_1vNnBCYjM>  10.<https://www.youtube.com/watch?v=JAMbALXeKXQ> |  |