Instructor: Donald Bartlett
Office Location Carbondale: Test Cell Room 101
Office Phone: 618-536-3371, ext. 212 Direct 618-453-9212
E mail flyer22@siu.edu
Office Hours: Monday 9:00 – 11:50
Tuesday 9:00 – 11:50
Pre-scheduled with student

COURSE DESCRIPTION AND OBJECTIVES:

This course consists of lecture and laboratory periods. Prerequisite: 111, 112 or consent of the School. Students should have knowledge of the operation, repair, inspection, and service of reciprocating and jet powerplant ignition systems and starting systems. They will be able to time, overhaul, and troubleshoot the various components of each system.

REQUIRED READING AND BOOKS:

Required:
A&P Powerplant Test Guide, ASA or Jeppesen
Also required: Your Choice:
A&P Powerplant books by: Jeppesen, Glencoe (Kroes), ASA, or Avotek

BOOK ASSIGNMENTS:
Part 1 - Basic Electricity
Lecture Notes

Part 2 – Introduction to magnetos
Kroes: Reciprocating ignition systems, Battery ignition and Auxiliary starting devices pp 167 – 185
Kroes: Aircraft spark plugs pp 197-204 - Aircraft Spark plug maintenance pp 201-204

Part 3 - Reciprocating Engine Starters & Starting systems
Kroes: Ignition Switch and Primary Circuits pp178-179
Ignition Boosters and Auxiliary Ignition Units pp179-183

Part 4 – Bendix and Slick magneto timing and inspection – Magneto inspection , Drift and Bump
Kroes: pp183 – 199 Continental Ignition High Tension Magneto Systems to Spark Plugs
Maintenance and Inspection to Replacement of Ignition Leads
A&P Jeppesen Powerplant: from Magneto Overhaul 8-80 to Engine Analyzer pp 8-89
Crane Powerplant: Special types of Magnetos pp 216 to Ignition Harness pp 227
AC 43-13: Magneto Inspection pp 8-15 to 8-19 and 8-19 to 8-21 para. 8-17

Part 5 - Aircraft Gas Turbine Ignition & Starting Systems
Kroes: Chapter 14 Ignition systems of gas turbine engines pp 357 – 372

QUIZES and EXAMS
There will be a number of quizzes during the semester given during the beginning of lecture. There will be written exams for lecture and lab material covered and one comprehensive final.

GRADES:
A failing grade in the lecture portion will result in a failing grade in the entire course regardless of the lab grade.

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<td>Lecture</td>
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<td>Lab</td>
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<td>Final Exam</td>
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Final Grade = divided by 3 (-) Attendance

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<tr>
<th>Grade Range</th>
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<td>90-100</td>
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(70% is minimum acceptable to receive FAA credit)

Any quizzes missed may not be made up. Any tests missed due to an unexcused absence may not be made up.

ATTENDANCE POLICIES:

Attendance is mandatory. As an FAA certified Airframe and Powerplant Mechanic Training Program, we must abide by the FAA’s attendance policy. Instructors are required to take roll each class period. It is the student’s responsibility to contact the instructor in advance of absences whenever possible or immediately thereafter to arrange make-up time where appropriate and to obtain hand-outs or other material from classes missed.

Students are expected to be in class and lab on time. Three late arrivals will be counted against the student as one unexcused absence. Unexcused absences or habitual tardiness will result in a cumulative reduction of the student's final grade point average: First unexcused absence results in a one-point reduction of the final grade (0-100 scale). Second absence results in a two-point reduction. Third absence results in a four-point reduction. Fourth absence results in an eight-point reduction. Fifth absence results in a sixteen-point reduction. After the fifth unexcused absence the cumulative grade reduction would be 31 points, making it impossible to receive a passing grade for the course.

Make up time may be granted at the discretion of the instructor. Final determination as to whether or not an absence is "excused" rests with the instructor. Performance of make-up time does not reinstate points lost due to unexcused absences. Any quizzes missed may not be made up. Any tests missed due to an unexcused absence may not be made up.
Cell Phones – Please turn OFF ringers. Texting is not aloud. WHILE IN CLASS! Use of any electronic device must be approved by the instructor

Lecture Topics
Part 1) Basic Electricity a Review
  - Ohms Law and the concepts of resistance and conductivity
  - Terms
  - Electromagnetism
  - Basic Alternating Current
  - Capacitance, Inductance
  - Lenz’s Law
  - Battery Ignition systems
  - Basic Magneto operation
  - Basic turbine engine ignition systems – vibrating DC

Exam 1 – Part 1

Part 2) Reciprocating Ignition Systems
  - Regulations
  - Timing and Ignition - Otto Cycle
    - Reciprocating engine design and operation
    - Gear Train
  - Magneto Systems
    - Classification
    - Types of Magneto
    - Identification Plates
    - Detail description of the construction, theory and operation
  - System Components
    - Circuits – switches and harness
    - Auxiliary starting devices
      - Theory – Why we need them
      - Impulse Couplings
      - Shower of sparks
    - Spark Plugs
      - Construction
    - Spark Plug malfunctions
      - Operating conditions
      - Spark Plug fouling
      - Other items

Exam 2 – Part 2

Part 3) Reciprocating engine starters and auxiliary starting devices
  - Starters and starter motors
    - History
    - Types of motors and starter motors
      - Direct cranking starters
        - Series wound
        - Shunt wound
        - Compound wound
        - Overrunning clutches
        - Bendix drive systems
    - Starter gear reduction
    - Starter inspection/maintenance
Auxiliary starting devices
Booster magnetos and booster coils
Induction vibrator auxiliary starting devices
   Bendix shower of sparks
   Unison/Slick systems
   Retard angle
Impulse Couplings
   Components and operation
   Lag angle
   Advantages/disadvantages of impulse couplings
   Impulse coupling inspection and maintenance

Exam 3 - Part 3

Part 4) Internal and magneto to engine timing
Timing Items
   Timing Light
   Specifics of internal timing
      Bendix magnetos
      Slick magnetos
   Magneto to engine timing
Magneto testing and inspection
   AC 43.13 requirements
   Preflight magneto inspection
   Magneto bump

Exam 4 – Part 4

Part 5) Aircraft gas turbine starting and starting systems
Turbine engine ignition systems
   Otto Cycle compared to the Brayton Cycle
Turbine ignition systems
Turbine engine starting systems
   Electric
      Starter/generators
      S/G inspections and maintenance
   Pneumatic
Turbine engine starting procedures
   Correctly starting a turbine engine
   Potential problems

Exam 5 - Part 5

Final Exam will be during Finals Week (See Attached)

**Academic Honesty**

You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate Catalog that pertain to academic honesty. You should consult with me if you are uncertain about an issue of academic honesty.
Emergency Procedures:

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on the BERT’s website at www.bert.siu.edu, Department of Public Safety’s website www.dps.siu.edu (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or shelter within the facility.
IMPORTANT DATES

Semester Class Begins: 08/24/2015
Last day to add a class (without instructor permission): 08/30/2015
Last day to withdraw completely and receive a 100% refund: 09/06/2015
Last day to drop a course using SalukiNet: 11/01/2015
Last day to file diploma application (for name to appear in Commencement program): 09/19/2015
Final Examinations: 12/14-12/18/2015

Note: For outreach, intern, and short course drop/add dates, visit Registrar’s Academic webpage http://register.siu.edu/

FALL SEMESTER HOLIDAYS

Labor Day Holiday 09/07/2015
Fall Break 10/10—10/13/2015
Veteran’s Day Holiday 11/11/2015

WITHDRAWAL POLICY - Undergraduate only

Students who officially register for a session may not withdraw merely by the stopping of attendance. An official withdrawal form must be initiated by the student and processed by the University. For the proper procedures to follow when dropping courses and when withdrawing from the University, please visit http://register.siu.edu/pdf/ugradcatalog1314.pdf

INCOMPLETE POLICY - Undergraduate only

An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within one semester following the term in which the course was taken, or graduation, whichever occurs first. Should the student fail to complete the course within the time period designated, that is, by no later than the end of the semester following the term in which the course was taken, or graduation, whichever occurs first, the incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. For more information please visit: http://register.siu.edu/grades/incomplete.html

REPEAT POLICY

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit no more than two times (two total enrollments) unless otherwise noted in the course description. For students receiving a letter grade of A,B,C,D, or F, the course repetition must occur at Southern Illinois University Carbondale. Only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned. See full policy at http://register.siu.edu/pdf/ugradcatalog1314.pdf

GRADUATE POLICIES

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please visit http://gradschool.siu.edu/gradcatalog/index.html

DISABILITY POLICY

Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must come to the DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements. http://disabilityservices.siu.edu/

PLAGIARISM CODE


MORRIS LIBRARY HOURS

http://www.libr.siu.edu/about

SAFETY AWARENESS FACTS AND EDUCATION

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: http://safe.siu.edu

SALUKI CARES

The purpose of Saluki Cases is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cases, (618) 453-5714, or salukicares@siu.edu, http://salukicares.siu.edu/index.html

EMERGENCY PROCEDURES

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. We ask that you become familiar with the SIU Emergency Response Plan and Building Emergency Response Team (BERT) programs. Please refer to the Building Emergency Response Protocols for Syllabus attachments on the following pages. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.

INCLUSIVE EXCELLENCE

SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ is an important part of education as well as an essential preparation for any career. For more information please visit: http://www.inclusiveexcellence.siu.edu/

LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:

Tutoring: http://tutoring.siu.edu/
Math Labs: http://tutoring.siu.edu/math_tutoring/index.html

WRITING CENTER

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit http://write.siu.edu/

AFFIRMATIVE ACTION & EQUAL OPPORTUNITY

Our office’s main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: http://diversity.siu.edu/

Additional Resources Available:

SALUKINET: https://salukinet.siu.edu/cp/home/displaylogin
ADVISEMENT: http://advisement.siu.edu/
SIU ONLINE: http://online.siu.edu/