Course: **Fluid Mechanics for Fire Protection – FPST 2483**
Semester: **Spring 2021**
Lecture: **Online**
Lab: **Online or at SWJTU Lab Facilities**
Discussion: **Mondays 8:50am-11:20am via zoom.**
Instructor: **Dr. Virginia Charter, PE**
Contact: **virginia.charter@okstate.edu**

Final Exam:

The final exam schedule is TBD. This is a mandatory comprehensive examination. All students will take the exam.

COVID-19 Information

Synchronous learning will be done via Canvas Conferences or Zoom.

When logging on for synchronous classes/labs/discussions, individual cameras are required to be turned on.

Catalog Description:

Fluid flow through hoses, pipes, pumps and fire protection appliances.
Water supply and distribution analysis using hydraulic calculations.
Testing techniques to detect anomalies in design or performance capabilities.

Prerequisites and Co-requisites:

FPST 1373 (co-requisite)
MATH 1613 or MATH 1813 (pre-requisite)

Course Objectives:

This course will familiarize the students with the fundamentals of fluid flow through hoses, pipes, pumps and fire protection appliances. Upon successful completion of this course the student will be able to solve water supply problems relative to friction loss and elevation using manual techniques and computer assistance. Students will understand how to analyze fire flow test data gathered in the field utilizing appropriate hydraulic formulae, graphs, nomographs, charts and tables, recording conclusions graphically and in writing. Students will be able to conduct water flow tests using recommended methods and procedures to obtain data and graphically illustrate available water supplies.

Learning Objectives

1. Discuss and demonstrate water flow tests using recommended methods and procedures and graphically represent available water supplies.

2. Explain the procedures to analyze fire flow test data utilizing appropriate hydraulic formulae, graphs, nomographs, charts and tables and record conclusions graphically and in writing.
3. Understand the procedure to solve water supply problems relative to friction losses and evaluation using manual calculations and computer assistance.

Course Learning Outcomes:

1. Conduct water flow tests using recommended methods and procedures and graphically represent available water supplies.
2. Analyze fire flow test data utilizing appropriate hydraulic formulae, graphs, nomographs, charts and tables and record conclusions graphically and in writing.
3. Solve water supply problems relative to friction losses and evaluation using manual calculations and computer assistance.

Required Texts & Fees:

Brock, P.D. *Fire Protection Hydraulics and Water Supply Analysis*, Fire Protection Publications, Stillwater, OK, Third edition.

Each student will receive handouts of additional materials to be used during the course.

Recommended:

Fire Protection Handbook, National Fire Protection Association, Quincy, MA, 20th edition (other version acceptable).

Reading Assignments:

Reading assignments are preparation for the lecture or laboratory period and completion prior to class or lab is expected. This class involves significant out-of-class assignments. The student is responsible for all material assigned regardless of inclusion in class lecture. Preparation for class discussions is expected. The Course Outline spreadsheet at the end of the syllabus lists the reading assignments.

Assignments and Conduct of the class:

<u>Incomplete</u> or not turned in assignments will receive a score of zero. Only <u>you</u> can submit your homework, a proxy is not permitted unless previous permission is authorized. Email submissions will NOT be accepted. Assignments are due at the time designated in the Canvas dropbox.

This class will have an on-line component using Online Classroom (Canvas). This course management tool is available at https://my.okstate.edu. Provided in-class are instructions for using Canvas. Lecture notes will not typically be posted in Canvas.

Turned in materials failing to follow the formatting instructions of the assignment will receive a grade of zero. Failure to place your name on the submitted file will result in a grade of zero. *Files submitted on Canvas must be in Word or PDF format and in one file.* Multiple files are not permitted to be submitted unless the assignment dictates it.

Calculation assignments will be submitted on engineering paper, unless a separate worksheet is provided (i.e. hydraulic calculation paper or graphs or Homework Assignment sheet). Assignments with multiple sheets of paper are required to be stapled. These assignments must be handwritten. Additionally, all calculations for both homeworks and labs will be completed utilizing pencil and have the answer clearly boxed.

Lab assignments are due at the end of the laboratory session time. No time extensions will be given. You are expected to come to lab prepared to complete the assignments.

Unless excused for valid (and unavoidable) university reasons, late work will receive a zero score. Turn in all work per the incomplete work criteria above. Travel for university functions is **not** an excuse for late work. Turn in assignments early or make alternative arrangements. Illness, death in the immediate family and other such emergencies are excusable under university policy. However, the student should contact the instructor or relevant SWJTU staff as soon as possible.

Discussion & Office Hours:

Discussion & Office Hours will be held virtually Mondays from 8:50am – 11:20am.

I will also respond to student questions by e-mail. I generally respond to course email questions within 24-48 hours, except on weekends.

Attendance & Engagement:

Students are here studying for a profession therefore promptness is expected. Attendance, as at a job, is required.

When logging into synchronous classes/labs/discussions, the following conditions must be followed:

- Individual cameras are required to be turned on, with the student's face clearly visible in the camera view
- Students should be fully clothed in the view of the camera.
- The background of the viewing area should be assessed and any inappropriate contents should be removed or covered.
- Do not attempt to operate a vehicle or other heavy machinery (i.e. driving a car) while logged in from a tablet or smart phone
- Do not log in from bed, restroom, or other inappropriate areas (as determined by the instructor).

Labs:
Failure to submit lab assignments **three times** on time will lead to a downgrade in the final grade of one letter. (A→B or B→C) Each subsequent lab missed will lead to an additional downgrade in the final grade of one letter.

Lab assignments are due at the end of the laboratory session time and to be uploaded to Canvas. No time extensions will be given.

Laboratory Dress Code

When attending labs (Pump Lab, Riser Lab, Large Fire Bay, and Fire Behavior Lab) and at the hazardous materials training laboratory, students must wear closed toed shoes and long pants that cover the tops of the shoes. Failure to wear proper attire will result in dismissal from the lab and a score of zero for the exercise. In addition to the standard lab attire, when visiting the Fire Service Training (FST) facility, students must bring a hard hat and safety glasses. Additional PPE may be required for specific lab activities.

FPST students are expected to have protective footwear meeting ANSI Z41/ASTM F-2412 and protective eyewear meeting ANSI Z87.1. Failure to wear appropriate PPE when required will result in a zero for the lab activity.

Classroom Behavior:

With respect to cell/smart phones, this is practice for a profession and professional conduct is expected. The student's conduct is expected to reflect being an adult and using technology in an appropriate manner e.g. participating in interactive surveys during class that use texting technology are appropriate; playing games, chatting with friends, etc. are not appropriate.

The use of recording equipment, IPODS, MP3 players, cell phones, the taking of video or photography are NOT PERMITTED without the expressed written consent of the instructor.

During exams, exam review sessions, exam rework sessions, or any other time when a student views an exam, any cell phone, or other electronic equipment use will automatically constitute cheating resulting in the requisite penalty.

Students who are disrupting class in any way (as defined by the instructor) will be asked to leave. Unprofessional communication e.g. by email, will receive no response from the instructor.

Communication:

The student will utilize professional correspondence. Using "hey" to begin an e-mail, using colloquial expressions such as "is it cool if," or failure to use a greeting, body (with complete sentences), and salutation is considered unprofessional and therefore will not be answered. The use of the niceties of polite society is strongly encouraged e.g. please and thank you.

Additionally, if the information can be found in the syllabus you may not receive a response.

Grading:

Course grades will be determined with the following weighting:

(Your total score on hourly exams/top total score) x 60 = X
(Total score on labs, etc. /top total store) x 15 = Y
(Your score on Final Exam/top score) x 25 = Z
X + Y + Z = Your TOTAL EQUIVALENT SCORE

The material in this course is essential professional material and a high level of competency is expected. Weighted equally in the grading of material are both quality of presentation and technical content.

Final Grade Scale
A = 85% to 100%
B = 75% to 84.9%
C = 60% to 74.9%
F = 59.9% and below

Academic Misconduct:

Copying the work of another for personal credit is **plagiarism** whether the work is a published work or the unpublished work of another student. Thoroughly reference all use of materials developed by others using APA 6th edition formatting. Use of electronic files that are the work of others is plagiarism. Complete all assignments individually unless specifically assigned as group work. While students may discuss assignments with each other, individual completion of the work is required. Plagiarism and work-sharing violations, as well as dishonesty on examinations, may result in reduction in grade, no credit, failure in the course, or an F! per university policy.

The minimum penalty for acts of academic dishonesty in this course is a grade of zero on the writing assignment or examination in question. Penalties may be much more severe, however, and could include an "F!" for the entire course and a

recommendation of additional disciplinary actions. University regulations regarding academic misconduct are applicable per http://academicintegrity.okstate.edu/ .

Academic dishonesty includes both giving and taking of improper assistance on writing assignments or examinations as well as any other form of attempting to gain credit for work that is not that of the student.

Permissible Calculators:

Permitted calculators for FPST exams are as follows:

Hewlett Packard -- HP 30s; Hewlett Packard - HP 33s; Hewlett Packard - HP 9s

Casio - FX 115 ES, FX115MS, andFX.115MSPlus (Note: FX115ES and FX115MS models ending with an "-SR" designation are also allowed.)
Texas Instruments - TI3OXA (or TI 3OXa);
Texas Instruments - TI 30X HS and TI 30X 11B; Texas Instruments - TI36X Solar
Note: almost all TI calculators with a TI 3x number are compliant with the department policy

These calculators are those typically permitted for certification and professional licensing examinations (CSP, FE, and CIH). Prohibited calculators include PDAs, cell phone calculators, or programmable calculators such as the TI 82, 83, 84 and 89.

Also allowed, after inspection by the instructor, are basic 4 or 5 function or nonprogrammable inexpensive scientific calculators. However, these basic calculators may put the student at a disadvantage on math problems that are complex or involve some special trig functions.

Special Accommodations for Students

If any member of this class feels that he/she has a disability and needs special accommodations of any nature whatsoever, the instructor will work with the student and the relevant SWJTU staff, to provide reasonable accommodations to ensure the student has a fair opportunity to perform this class. Please advise the instructor of such disability and the desired accommodations at some point immediately after the first scheduled class period.

Religious Holidays

Should the student have any religious holidays that he or she wishes the instructor to consider, inform the instructor during the first week of class. Failure to notify the instructor during the first week of class results in no accommodation for religious holidays.