



**DEPARTMENT OF FINANCIAL SERVICES**

Division of State Fire Marshal  
Bureau of Fire Standards and Training

---

## Title: Syllabus for Fire Service Hydraulics

Revision: October 2019

---

### *Section I - Course Information*

**Course Title:** Fire Service Hydraulics

**Course Number(s):** BFST/FFP/ATP1301

**Class Days/Time:** If being taught at the Florida State Fire College Campus 11655 NW Gainesville Road, Ocala, FL 34482 Bldg. C – Classrooms – Monday - Friday 8 a.m.- 5 p.m. Additional coursework outside the classroom totaling five (5) hours of work may be assigned.

---

### *Section II - Points of Contact*

**Training Supervisor:**

Name: Frank Ennist  
Email: [Frank.Ennist@myfloridacfo.com](mailto:Frank.Ennist@myfloridacfo.com)  
Work Phone: 352-369-2838  
Bldg. C Room 158

**Program Manager:**

Name:  
Email:  
Work Phone:  
Bldg. C Room 158

---

### *Section III – Course Description*

This course covers the relationship between flow, pressure, and mathematical hydraulic formulas. The course includes pump theory, pump rating, and pressure and vacuum gauges.

---

### *Section IV - Course Materials, Grading, and Attendance*

**Recommended Book:** *Pumping and Aerial Apparatus Driver/Operator Handbook (3<sup>rd</sup> ed.)*; IFSTA Publishing (2015) ISBN: 978-087039571-1

**Prerequisite(s):** None

**Contact Hours:** This class has 45 contact hours.

**Continuing Educations Units (CEU's):** 45 hours towards Fire Safety Inspector, Instructor I, II, III renewal

**Pre-Course Assignment:** None

**Required Materials:** Paper, pens, USB portable storage device (thumb drive)

**Grading:** Students must achieve a minimum cumulative score of 70% to pass this course. Course grades are determined from assignments and activities including, homework, projects, quizzes, exams, and presentations. Below is the breakdown of the final accumulative grading:

- Individual Exercises 20 points
- Quizzes 20 points
- Final Practical Exam 30 points
- Final Written Exam 30 points

**Attendance:** Students are required to attend all sessions of the course.

- Excused absences - Students are permitted excused absences totaling no more than 10% of class (4.5 hours maximum); the instructor shall be the sole determining authority in the determination of an excused absence and may assign supplemental work to make up for missed class time.
- Unexcused absences - The instructor shall be the sole determining authority in the determination of an unexcused absence (i.e. “no call, no show”). The instructor has no obligation to offer the student an opportunity to make up assignments, including quizzes and/or exams, but may do so at his/her discretion.

---

### ***Section V - Instructor Qualifications***

As per Chapter Florida Administrative Codes (Rule), *Programs of Study and Vocational Courses*, instructors must meet the following qualifications to be authorized to teach this course:

Rule: 69A-37.039(1)(b)(c)

1. An Instructor I shall hold a state certificate of competency for Pump Operator.
2. An Instructor II or III may teach providing he or she has successfully completed the course

---

### ***Section VI – Job Performance Requirements***

Given information from discussion and reading materials, the student will satisfy the Job Performance Requirements (JPR) of the applicable National Fire Protection Association (NFPA) standards, any applicable skill sheets, and the applicable Fire and Life Safety Initiatives of the National Fallen Firefighters Foundation *Everyone Goes Home* program.

NFPA 1002, Standard for Fire Apparatus Driver/Operator Professional Qualifications, 2017 Edition

---

THE BUREAU OF FIRE STANDARDS AND TRAINING  
AT

**The Florida State Fire College**

11655 NW GAINESVILLE ROAD • OCALA FLORIDA • 34482-1486  
352.369.2800 • [WWW.FLORIDASTATEFIRECOLLEGE.ORG](http://WWW.FLORIDASTATEFIRECOLLEGE.ORG)

**5.1\*** General. The requirements of Fire Fighter 1 as specified in NFPA1001 (or the requirements of Advanced Exterior Industrial Fire Brigade Member or Interior Structural Fire Brigade Member as specified in NFPA1081) and the job performance requirements defined in Sections 5.1 and 5.2 shall be met prior to qualifying as a fire department driver/operator—pumper.

**5.1.1** Perform the routine tests, inspections, and servicing functions specified in the following list in addition to those in **4.2.1**, given a fire department pumper, its manufacturer's specifications, and policies and procedures of the jurisdiction, so that the operational status of the pumper is verified:

- (1) Water tank and other extinguishing agent levels (if applicable)
- (2) Pumping systems
- (3) Foam systems

**(A) Requisite Knowledge.** Manufacturer's specifications and requirements, and policies and procedures of the jurisdiction.

**(B) Requisite Skills.** The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

**5.2.1** Produce effective hand or master streams, given the sources specified in the following list, so that the pump is engaged, all pressure control and vehicle safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is continuously monitored for potential problems:

- (1) Internal tank
- (2)\*Pressurized source
- (3) Static source
- (4) Transfer from internal tank to external source

**(A) Requisite Knowledge.** Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end mains, low-pressure and private water supply systems, hydrant coding systems, and reliability of static sources.

**(B) Requisite Skills.** The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

**5.2.2** Pump a supply line of 2 1/2 in. (65 mm) or larger, given are lay pumping evolution the length and size of the line and the desired flow and intake pressure, so that the correct pressure and flow are provided to the next pumper in the relay.

**(A) Requisite Knowledge.** Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end mains, low-pressure and private water supply systems, hydrant coding systems, and reliability of static sources.

**(B) Requisite Skills.** The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

**5.2.3** Produce a foam fire stream, given foam-producing equipment, so that properly proportioned foam is provided.

**(A) Requisite Knowledge.** Proportioning rates and concentrations, equipment assembly procedures, foam system limitations, and manufacturer's specifications.

**(B) Requisite Skills.** The ability to operate foam proportioning equipment and connect foam stream equipment.

**5.2.4** Supply water to fire sprinkler and standpipe systems, given specific system information and a fire department pumper, so that water is supplied to the system at the correct volume and pressure.

**(A) Requisite Knowledge.** Calculation of pump discharge pressure; hose layouts; location of fire department connection; alternative supply procedures if fire department connection is not usable; operating principles of sprinkler systems as defined in NFPA 13, NFPA 13D, and NFPA 13R; fire department operations in sprinklered properties as defined in NFPA 13E; and operating principles of standpipe systems as defined in NFPA 14.

**(B) Requisite Skills.** The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

---

### *Section VIII – Final Practical*

#### **Description of Assignment:**

The Final Practical Skills Check-off is designed for the student to demonstrate competency of the skills identified through the following JPR's in NFPA 1002.

- Students will be required to complete a pumping scenario using skills from NFPA 1410
- Students will be required to complete practical skills to include the following skills identified by NFPA 1002:
  1. Perform routine tests, inspections and servicing functions on the systems and components of a fire department vehicle.
  2. Document routine tests, inspections and servicing functions.
  3. Given various apparatus with systems and equipment, operate all fixed systems and equipment on the instructions and policies.

---

*Section IX – Review Date and Author*

February 4, 2020 Frank Ennist