Irrigation ASSOCIATION®

# Classroom Resources & Online Learning

## Building a stronger industry workforce


## 2018 Publications Catalog

*Educator Edition*

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# IA Classroom Resources

The Irrigation Association is committed to strengthening the industry's workforce of today and tomorrow by creating quality education resources for continuing professional development.

Geared toward career seekers and educators, this catalog presents IA's curriculum resources developed for use by colleges and technical schools. Although developed for a classroom environment, these resources are available to anyone in the industry and are an excellent resource for irrigation basics. A teaching kit and workbooks are available for each title presented.

## Teaching Kits

Instructional lecture materials are designed for a 50-minute class unless otherwise indicated. Lab materials are designed for two- to three-hour laboratory classes. Teaching kits include:

- PowerPoint slide deck.
- Teaching manual with a screen shot of each PowerPoint slide and teaching notes.
- Workbook with practice problems and quizzes.
- Additional teaching resources, such as sample spreadsheets, graphics, materials lists and suggested quiz and test questions.

**Pricing: Teaching Toolkits**
Academia $60 | IA Member $220 | Nonmember $320
*Irrigation Components:* Academia $80 I Member $330 I Nonmember $480

## Workbooks

Workbooks are focused on single-subject principles and concepts. Workbook contents include:

- Practice problems
- Tables
- Calculation worksheets
- Glossary of terms
- Other references

**Pricing: Workbooks**
Academia $15 | IA Member $20 | Nonmember $25
*Irrigation Components:* Academia $20 I Member $25 I Nonmember $35

*Descriptions of the available subjects are listed on the following pages. Workbooks are three-hole punched binder inserts.*

**Visit www.irrigation.org/store for the most up-to-date listing of IA's education resources.**

## Save on Teaching Packages

The subjects offered can make up a full course or part of a course. Buy any five as a package and receive a **30 percent** discount.

*Also Available:*
## Resource Combination Packages

If a combination of materials fits your purposes, IA offers special pricing for purchase of more than one classroom resource. Contact the IA education department for further information at **703.536.7080**.

e18

# Agriculture & Turf/Landscape/Golf

## Advanced Pumps

*By: Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

This course is designed to enhance understanding of how pumps really work. It covers centrifugal pump curve development starting with basic descriptions and analogies leading to an in-depth discussion of H-Q curves. The families of curves for differing impeller diameters are developed step-by-step as are efficiency curves. Cavitation is discussed in detail. Positive displacement pumps, their performance curves, and appropriate use are also covered. Variable frequency drives are discussed.

*(28 pgs., ISBN: 978-1-935324-65-2) (2013)* Code: EF_AP_SM

## Basic Irrigation Hydraulics


*By: Ramesh Kumar, PhD, CGIA, CIC, CID, CLIA and Eudell Vis, CID, CLIA*

Introduce students to basic hydraulic principles and how they are applied in irrigation systems. This workbook addresses how pressure is created, the difference between static and dynamic pressure and flow, as well as an introduction to friction loss in piping, fittings and other irrigation system components.

*(67 pgs., ISBN: 978-1-935324-01-0) (2013)* Code: EF_BH_SM

## Introduction to Pumps

*By: Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

Understand when pumps are needed, how they work and how to select a pump. Explore how to extract the information from a typical pump curve, and understand how the pump interacts with the system.

*(24 pgs., ISBN: 978-1-935324-31-7) (2013)* Code: EF_IP_SM

## Irrigated Soils

*By: Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

Learn about the components of soils, formation, physical properties, textural classes, water movement within the soil, and water uptake by plants. Gain a solid grasp of the soil/water relationship in this course — essential for anyone in the industry.

*(39 pgs., ISBN: 978-1-935324-14-0) (2013)* Code: EF_IS_SM

## Irrigation Hydraulics Laboratory

*By: Ronald E. Sneed, PhD, PE, CAIS, CIC, CID, CLIA*

Help students understand hydraulic principles by seeing them in action. This laboratory exercise provides hands-on experience at reading meters and gauges, and observing how hydraulic principles impact sprinkler performance. A companion to *Basic Irrigation Hydraulics*.

*(48 pgs., ISBN: 978-1-935324-48-5) (2014)* Code: EF_IH_SM

## Soil-Plant-Air Continuum

*By: Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

Learn how water moves from the soil to plants to the air and back again as part of the soil-plant-air continuum. This course covers how plants use water for transpiration and photosynthesis, store energy from the sun for use by other living things, and use and emit carbon and oxygen in a continuous cycle that is essential to life.

*(21 pgs., ISBN: 978-1-935324-26-3) (2014)* Code: EF_SPAC_SM

## Sprinkler Spacing

*By: Kenneth H. Solomon, PhD, PE; Ronald E. Sneed, PhD, PE, CAIS, CIC, CID, CLIA; Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC; Brian Vinchesi, CGIA, CIC, CID, CLIA, CLIM, CLWM; and Lynda Wightman, CGIA, CLIA*

This is the first of a three-part set on designing fixed spacing sprinkler systems. A key step in the design of any sprinkler system is deciding where to place the sprinklers. To make the right placement decisions, you need to understand that the underlying objective is to provide a uniform application of water. Uniformity of application is related to sprinkler spacing through the concept of overlap. This module explains the terminology, concepts and considerations used in making sprinkler spacing decisions.

*(40 pgs., ISBN: 978-1-935324-57-7) (2012)* Code: EF_SS_SM

## Sprinkler Irrigation Uniformity

*By: Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

Part two of the set presents sprinkler distribution uniformity. Sprinkler systems should be designed to apply water as uniformly as is economically practical. While the description of uniformity involves mathematics, this module is designed to graphically convey the concept of overlapping sprinklers and the resulting uniformity. The mathematical formulae for describing uniformity are explained and are related to a visual presentation of the uniformity.

*(35 pgs., ISBN: 978-1-935324-59-1) (2012)* Code: EF_SU_SM

## Sprinkler Irrigation Efficiency & Management

*By: Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

Part three of the series shows how irrigation efficiency relates to uniformity and how management affects uniformity. Continuing to use graphics, the module shows how management affects efficiency and how uniformity and management together can maximize efficiency.

*(15 pgs., ISBN: 978-1-935324-61-4) (2012)* Code: EF_SE_SM

# Agriculture

## Agricultural Sprinklers

*By: Ronald E. Sneed, PhD, PE, CAIS, CIC, CID, CLIA*

Growers, farmers, regulatory agencies and environmentalists are driving advances in technology by demanding irrigation systems that better manage water and energy resources. This workbook covers sprinkler irrigation systems used in production agriculture, including criteria to select the best option based on crop type and site-specific growing conditions.

*(29 pgs., ISBN: 978-1-935324-44-7) (2014)* Code: EF_AS_SM

## Precipitation Rates for Agricultural Sprinkler Systems

*By: Ronald E. Sneed, PhD, PE, CAIS, CIC, CID, CLIA*

Learn how to calculate precipitation rates and develop irrigation schedules for sprinkler systems used in production agriculture. Includes practice problems for different scenarios using sprinklers to irrigate crops. A companion to *Agricultural Sprinklers*.

*(32 pgs., ISBN: 978-1-935324-46-1) (2014)* Code: EF_PRAS_SM

# Turf/Landscape/Golf

## Basic Electricity for Irrigation Systems

*By: Vince Nolletti and Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

This workbook is a basic primer for electricity in irrigation systems. Reviews electrical terminology, the rationale behind electrical codes and safety requirements, typical circuits used in control system wiring, and calculating the correct wire size and length.

*(24 pgs., ISBN: 978-1-935324-38-6) (2012)* Code: EF_BE_SM

## Design Capacity & Available Pressure

*By: Bradford R. Monroe, CID*

Evaluate various water sources for irrigation system designs. This workbook teaches students to determine the maximum safe flow and calculate water and pressure requirements to meet the irrigation demands of a particular field or landscape.

*(58 pgs., ISBN: 978-1-935324-03-4) (2014)* Code: EF_DC_SM

## Electrical Troubleshooting for Landscape Irrigation Systems


*By: Donald D. Franklin, CID, CLIA*

Learn how to diagnose common irrigation faults found in the field. This workbook covers meters commonly used in landscape systems and how to read them, as well as the recommended sequence to troubleshoot electrical problems. Appropriate for use as a lecture or laboratory exercise.

*(38 pgs., ISBN: 978-1-935324-40-9) (2013)* Code: EF_ET_SM

## Introduction to Two-Wire Technology

*By: Tone Ware*

This workbook introduces two-wire systems as an alternative to multi-wire systems. General design criteria are identified and the advantages and disadvantages of the two systems are compared. Characteristics of components and operation of two-wire systems are covered in detail. System cost examples are presented.

*(41 pgs., ISBN: 978-1-935324-64-5) (2014)* Code: EF_TW_SM

## Irrigation Components: Residential/ Small Commercial Systems


*By: Kurt Thompson, CGIA, CIC, CID, CIT, CLIA, CLWM*

Understanding the parts that make up a residential or small commercial landscape is fundamental to designing, installing or troubleshooting a system. This manual describes the components of these systems from the point of connection until the water hits the ground, the control systems, and how they work with the whole system.

*(83 pgs., ISBN: 978-1-935324-42-3) (2013)* Code: EF_IC_SM

## Irrigation Pipe Sizing

*By: Bradford R. Monroe, CID*

Learn how to properly size pipe for more economical irrigation systems that perform correctly. This workbook covers the friction factor and velocity methods and guidance on when to use which method. Practice problems help students develop skills, including using friction loss charts.

*(69 pgs., ISBN: 978-1-935324-02-7) (2014)* Code: EF_PS_SM

## Irrigation Systems Performance Audit Laboratory

*By: Eugene W. Rochester, PhD, PE, CID, CLIA; Brent Q. Mecham, CID, CLWM, CIC, CAIS; and Robert D. von Bernuth, PhD, PE, CID, CLWM, CIC*

Learn the basics of auditing irrigation systems. This laboratory exercise provides hands-on experience with conducting an audit, including measuring sprinkler head performance, net precipitation rate and distribution uniformity, and creating irrigation schedules.

*(30 pgs., ISBN: 978-1-935324-05-8) (2012)* Code: EF_ISPA_SM

## Precipitation Rates for Turf/ Landscape Sprinkler Systems

*By: Bradford R. Monroe, CID*

Calculate how fast water is applied to the landscape by irrigation systems. This workbook explains how nozzle flow rate and sprinkler spacing impact precipitation rates, and the relationship between matched precipitation rates and sprinkler uniformity.

*(43 pgs., ISBN: 978-1-935324-09-6) (2014)* Code: EF_PRTL_SM

# Curriculum Suggestions

This table is intended to be a guide for choosing the right materials to support the type of irrigation curriculum being presented. There are four categories of classes:

- Introduction — a general overview but without the depth needed to design or troubleshoot.
- Design — introductory material and more in-depth content to support teaching system design.
- Complete — all the material for either agriculture or turf/landscape, including introductory, design, troubleshooting and supplemental material.
- Troubleshooting — material to support troubleshooting turf/landscape systems with an emphasis on components, electricity and hydraulics.

The complete package would easily supply enough material for a three-credit semester course in irrigation. Depending on the level of the course and the background of the students, it could be more than three credits. The numbers are the suggested order for presentation in the selected curriculum.

| | Agriculture | Turf/Landscape | | | | Agriculture & Turf/Landscape | | |
|---|---|---|---|---|---|---|---|---|
| | Complete | Introduction | Design | Complete | Troubleshooting | Introduction | Design | Complete |
| Advanced Pumps | 12 | | | 16 | | | | 16 |
| Agricultural Sprinklers | 4 | | | | | 2 | 2 | 17 |
| Basic Electricity for Irrigation Systems | | | | 10 | 1 | | | 10 |
| Basic Irrigation Hydraulics | 2 | 2 | 2 | 2 | 2 | 5 | 6 | 2 |
| Design Capacity & Available Pressure | 5 | | 4 | 4 | | 6 | 7 | 4 |
| Electrical Troubleshooting for Landscape Irrigation Systems | | | | 11 | 3 | | | 11 |
| Introduction to Pumps | 11 | | | 15 | | | | 15 |
| Introduction to Two-Wire Technology | | | | 12 | 7 | | | 12 |
| Irrigated Soils | 1 | 1 | 1 | 1 | | 1 | 1 | 1 |
| Irrigation Components: Residential/Small Commercial Systems | | 3 | 5 | 5 | 4 | | | 5 |
| Irrigation Hydraulics Laboratory | 3 | | | 13 | 5 | | | 13 |
| Irrigation Pipe Sizing | 6 | | 3 | 3 | 6 | | 3 | 3 |
| Irrigation Systems Performance Audit Laboratory | | | | 14 | | | | 14 |
| Precipitation Rates for Agricultural Sprinkler Systems | 7 | | | | | 3 | 4 | 18 |
| Precipitation Rates for Turf/Landscape Sprinkler Systems | | | 6 | 6 | | 4 | 5 | 6 |
| Soil-Plant-Air Continuum | 13 | | | 17 | | | | 19 |
| Sprinkler Irrigation Efficiency & Management | 10 | | 9 | 9 | | | 10 | 9 |
| Sprinkler Irrigation Uniformity | 9 | | 8 | 8 | | 8 | 9 | 8 |
| Sprinkler Spacing | 8 | | 7 | 7 | | 7 | 8 | 7 |

## License a Class

IA class licenses are available for individuals who want to become IA class providers and to organizations that would like to offer IA classes multiple times. Licensed classes are promoted on IA's website and in IA marketing collateral.

For more information, contact the IA education department at **education@irrigation.org** or visit **www.irrigation.org/education**.

## About the Irrigation Association

Dedicated to promoting efficient irrigation, the Irrigation Association is the leading membership organization for irrigation equipment and system manufacturers, dealers, distributors, designers, consultants, contractors and end users. IA works to improve industry proficiency, advocate sound water management and grow demand for water-efficient technologies, products and services.

# IA Online Learning

## Online Classes

IA's online learning center makes continuing education easier and more affordable than ever. Hands-on, interactive lessons let you study whenever and wherever you're most focused and ready to learn, without having to attend a formal class. You can work at your own pace and take intermittent quizzes to test progress. A beginning student can learn the basics or a veteran can refresh on principles. It is also a good way to gain CEUs to support your certification. Courses are four CEUs and are accessible for 90 days.

Cost-effective, online classes include:

- Agriculture Irrigation Hydraulics
- Agriculture Sprinklers & Precipitation Rates
- Electrical Troubleshooting for Landscape Irrigation Systems
- Introduction to Pumps
- Irrigated Soils
- Landscape Irrigation Hydraulics
- Landscape Irrigation Precipitation Rates
- Landscape Irrigation Scheduling
- Soil-Plant-Air Continuum

Member $110* | Nonmember $150*

## ITRC Online Classes

The Irrigation Association has partnered with Cal Poly's Irrigation Training and Research Center to offer a new series of online courses for landscape irrigation. Each ITRC class includes:

- Videos
- Reading
- Interactive assignments
- Online quizzes

Pricing* and CEUs vary based on class length. Member pricing is listed first followed by nonmember pricing. Courses are accessible for 90 days.

- Basic Hydraulics (3 CEUs, $80/$105)
- Basic Soil-Plant-Water Relationships (2 CEUs, $55/$70)
- Distribution Uniformity & Precipitation Rate (1.5 CEUs, $45/$60)
- Evapotranspiration (1 CEU, $28/$38)
- Irrigation System Components (3 CEUs, $80/$105)
- Landscape Irrigation Auditor (4 CEUs, $110/$145)
- Landscape Sprinkler Design (8 CEUs, $220/$285)
- Scheduling for Auditors (2 CEUs, $55/$70)
- Scheduling for Sprinkler Design (1.5 CEUs, $45/$60)

**For more information about online classes and irrigation seminars, visit www.irrigation.org/learningondemand.**

*Prices are subject to change without notice.

## Online Irrigation Seminars

IA has introduced a new series of irrigation seminars from the Irrigation Shows. Seminars are offered in two tracks: one for agricultural interests and one for landscape interests. Seminars address irrigation industry best practices — the underlying concepts and implementation "how to's" of efficient irrigation and water management. Earn one CEU for each one-hour seminar. Seminars are accessible for 90 days.

### Agriculture Irrigation Topics

- Auditing Ag Drip/Microirrigation Systems
- Auditing Center Pivot Systems for Nozzle Performance
- Benefits of Pressure Compensation
- Calculating Precipitation Rates for Mechanized Ag Irrigation Systems
- Economics of Irrigation
- Irrigating With Variable Rate Irrigation
- Irrigation for Vegetable Crops
- Maintenance of Microirrigation Systems
- Recent Advances in Remote Sensing for Mechanized Irrigation Management
- Solutions for Maximizing Irrigated Areas Using Moving Sprinkler Systems
- Water Movement in Soils

### Turf/Landscape Irrigation Topics

- Analyzing Water Sources for Landscape Irrigation
- Auditing of Landscape Drip Irrigation Systems
- Automating Water Flow Measurement With Sensors
- Basics of Filtering
- Basics of Water Efficient Irrigation Products – NEW!
- BMP – Basis for Design – NEW!
- Catchment Systems for Alternate Water Sources
- Commissioning an Irrigation System
- Deficit Irrigation for Managing Landscapes
- Do's & Don'ts of Backflow Prevention Devices
- Earning Points for Green Projects
- Estimating Landscape Plant Water Use
- Field Study of Uniformity Improvements From Multi-Stream Rotational Spray Heads
- Graywater Irrigation
- Irrigating Green Roofs – NEW!
- A New Way to Evaluate Sprinkler Performance – NEW!
- Pressure Regulation to Improve Irrigation Efficiency – NEW!
- Proper Grounding Techniques
- Rainwater Harvesting – Engineered Failures
- Rainwater Harvesting – Underground Storage Design & Construction
- Rainwater Harvesting for Irrigation
- Refining the Landscape Coefficient for Improved Irrigation Management
- Return on Investment for Irrigation Upgrades
- Smartphone Apps for Irrigation Management
- Solvent Welding PVC Pipe – NEW!
- Starting With Efficiency
- Sustainable Landscapes & Water-Use Efficiency
- Treating Alternative Water for Irrigation
- Using Water Budgets as a Management Tool
- Water Movement in Soils & Its Implications for Landscape Drip Irrigation
- Water Quality for Ornamental Plants/Landscaping
- Watering Within the Lines: Water Use Restrictions vs. Water Budgets
- Workforce Training – NEW!

Member $28* | Nonmember $38*

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## Pricing

**Teaching Toolkit**

Academia $60 | IA Member $220 | Nonmember $320

*Irrigation Components:* Academia $80 | Member $330 | Nonmember $480

**Workbooks**

Academia $15 | IA Member $20 | Nonmember $25

*Irrigation Components:* Academia $20 | Member $25 | Nonmember $35

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