

Hands-on Relay School Schedule

SUNDAY, MARCH 11, 2018

3:00-6:00p.m. Facilitator Lab Station Set-up

EE/ME Laboratory Rooms

5:30 - 7:30 p.m. Registration & Reception

University Inn, Moscow, ID

7:00 – 8:00 p.m. Facilitator Meeting

University Inn, Moscow, ID

MONDAY, MARCH 12, 2018

6:45 - Registration & Refreshments

7:30 Todd Hall, Main Atrium

7:30 - Welcome & Announcements

Todd Hall 116

7:40 - Safety Presentation

Todd Hall 116

8:00 TRACK OVERVIEW LECTURES

Distribution Todd Hall 120

Generation Todd Hall 125

Transmission/Theory Todd Hall 130

Doble Todd Hall 133

Enoserv RTS Todd Hall 230

Megger AVTS Todd Hall 226

Manta Todd Hall 204

Omicron Todd Hall 220

Electromechanical Todd Hall 120, 125, or 130

**Electromechanical Track attend choice of Distribution, Generation or Transmission Overview

Basic Todd Hall 116

**Basic Track attend the Introduction to System Protection Lecture Series

8:00 Series Topic: Introduction to Protection Basics and Terminology

9:40 Break - Todd Hall Atrium

9:50 CONCURRENT OPEN LECTURES

• Digital Logic for Protection and Control Todd Hall 125

• Symmetrical Components 1 Todd Hall 130

• Mho Testing Techniques & Math 1 Todd Hall 133

• Transformer Protection Todd Hall 216

• DNP 3.0 Todd Hall 120

• Two- & Three-Winding Transformer Connections and Todd Hall 230

Circulating Currents

Introduction to System Protection Lecture Series (continued) Todd Hall 116

9:50 Series Topic: Technicians Basic Math Review

Hands-on Relay School Schedule

11:00 CONCURRENT OPEN LECTURES

- Phasors Todd Hall 116
 - Symmetrical Components 2 Todd Hall 130
 - Mho Testing Techniques & Math 2 Todd Hall 133
 - The X, Y, and Z of Circuit Breaker Control Todd Hall 216
 - In-Service Testing Todd Hall 120
 - Fault Analysis for Technicians Todd Hall 230
- Introduction to System Protection Lecture Series** (continued) Todd Hall 116
11:00 Series Topic: Introduction to Phasors including Phasor Math

12:00 Lunch on your own

Following lunch, all students will move to the EE/ME, Sloan Hall, and Carpenter Hall for the remainder of the day.

1:00

• Basic - Introduction to System Protection Lecture

Series (continued)

- Basic students attend: Sloan 175
- 1:00 Series Topic: Introduction to Relay Coordination Principles
 - 2:00 Series Topic: Lessons Learned from the Field
- Basic Lab Facilitators report to EE/ME B54

HANDS-ON EXPERIENCE IN THE LAB

- **Distribution:** Basler: Be1-11F EE/ME 56
- **Generation:** Beckwith: 3425A Sloan 169
- **Transmission:** ABB: KD10 EE/ME 34
- **Electromechanical:** GE: BDD Sloan 150
- **Doble Advanced:** ABB: IRD9 Sloan 5
- **Doble Beginning:** GE: IAC53 Sloan 7
- **Enoserv Advanced:** ABB: IRD9 Sloan 9
- **Enoserv Beginning:** GE: IAC53 Sloan 46
- **Megger:** ABB: CO Sloan 38
- **Manta:** ABB: CO Sloan 167
- **Omicron Advanced:** ABB: IRD9 Sloan 161
- **Omicron Beginning:** GE: IAC53 Sloan 163
- **Theory:** Transmission Line Protection Carpenter 101/102

3:00 Break - EE/ME Building outside Room 26 & B54, Automated Tracks near Sloan 7 & 169

3:10 CONTINUE LABORATORY TESTING

- **Basic:** ABB: CO EE/ME B54

5:00 Adjourn

Dinner on your own

Optional Social Get Together at Birch & Barley

Hands-on Relay School Schedule

TUESDAY, MARCH 13, 2018

7:30 CONCURRENT OPEN LECTURES

- Digital Logic for Protection and Control Todd Hall 125
- Symmetrical Components 1 Todd Hall 130
- Mho Testing Techniques & Math 1 Todd Hall 133
- Transformer Protection Todd Hall 216
- DNP 3.0 Todd Hall 120
- Two- & Three-Winding Transformer Connections and Circulating Currents Todd Hall 230

8:40 CONCURRENT OPEN LECTURES

- Phasors Todd Hall 125
- Symmetrical Components 2 Todd Hall 130
- Mho Testing Techniques & Math 2 Todd Hall 133
- The X, Y, and Z of Circuit Breaker Control Todd Hall 216
- In-Service Testing Todd Hall 120
- Fault Analysis for Technicians Todd Hall 230

9:40 Break - Todd Hall Atrium

9:50 CONCURRENT OPEN LECTURES

- Digital Logic for Protection and Control Todd Hall 125
- Symmetrical Components 1 Todd Hall 130
- Mho Testing Techniques & Math 1 Todd Hall 133
- Transformer Protection Todd Hall 216
- DNP 3.0 Todd Hall 120
- Two- & Three-Winding Transformer Connections and Circulating Currents Todd Hall 230

11:00 CONCURRENT OPEN LECTURES

- Phasors Todd Hall 125
- Symmetrical Components 2 Todd Hall 130
- Mho Testing Techniques & Math 2 Todd Hall 133
- The X, Y, and Z of Circuit Breaker Control Todd Hall 216
- In-Service Testing Todd Hall 120
- Fault Analysis for Technicians Todd Hall 230

12:00 Lunch on your own

Following lunch, all students will move to the EE/ME & Sloan Halls for the remainder of the day.

1:00 HANDS-ON EXPERIENCE IN THE LAB

- **Basic:** ABB: RC EE/ME B54
- **Distribution:** Cooper: Form 6 EE/ME 56
- **Generation:** Beckwith: 3425A Sloan 169
- **Transmission:** ABB: IRD9 EE/ME 34
- **Electromechanical:** ABB: CA Sloan 150
- **Doble Advanced:** SEL: 587 Sloan 5
- **Doble Beginning:** GE: BDD Sloan 7
- **Enoserv Advanced:** SEL: 587 Sloan 9
- **Enoserv Beginning:** GE: BDD Sloan 46
- **Megger:** GE: BDD Sloan 38

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- **Manta:** GE: BDD Sloan 167
- **Omicron Advanced:** SEL: 587 Sloan 161
- **Omicron Beginning:** GE: BDD Sloan 163
- **Theory:** Remedial Action Schemes (RAS) Carpenter 101/102

3:00 Break - EE/ME Building outside Room 26 & B54, Automated Tracks near Sloan 7 & 169

3:10 CONTINUE LABORATORY TESTING

- **Basic:** Basler: BE1-810/U / BE1-51 EE/ME B54
- **Generation:** GE: G60 Sloan 169
- **Electromechanical:** ABB: CVE1 Sloan 150

5:00 Adjourn

Dinner on your own

6:30 - 9:00 SUPPLIER'S SHOWCASE

University Inn, Moscow

WEDNESDAY, MARCH 14, 2018

7:30 HANDS-ON EXPERIENCE IN THE LAB

- **Basic:** ABB: HU EE/ME B54
- **Distribution:** SEL: 351A EE/ME 56
- **Generation:** GE: G60 Sloan 169
- **Transmission:** Beckwith: M-3311A EE/ME 34
- **Electromechanical:** GE: CEH51 Sloan 150
- **Doble Advanced:** SEL: 311L Sloan 5
- **Doble Beginning:** SEL: 587 Sloan 7
- **Enoserv Advanced:** SEL: 311L Sloan 9
- **Enoserv Beginning:** SEL: 587 Sloan 46
- **Megger:** ABB: IRD9 Sloan 38
- **Manta:** ABB: IRD9 Sloan 167
- **Omicron Advanced:** SEL: 311L Sloan 161
- **Omicron Beginning:** SEL: 587 Sloan 163
- **Theory:** Phasor Measurement Units (PMUs) Carpenter 101/102

10:00 Break - EE/ME Building outside Room 26 & B54, Automated Tracks near Sloan 7 & 169

- **Generation:** SEL: 700G Sloan 169

10:10 CONTINUE LABORATORY TESTING

12:00 Lunch on your own

1:00 HANDS-ON EXPERIENCE IN THE LAB

- **Basic:** GE: JBCG EE/ME B54
- **Distribution:** ABB: REF615 EE/ME 56
- **Generation:** SEL: 700G Sloan 169
- **Transmission:** SEL: 487E EE/ME 34
- **Electromechanical:** GE: GCX Sloan 150
- **Doble Advanced:** SEL: 311L Sloan 5
- **Doble Beginning:** ABB: IRD9 Sloan 7

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- **Enoserv Advanced:** SEL: 311L Sloan 9
- **Enoserv Beginning:** ABB: IRD9 Sloan 46
- **Megger:** SEL: 587 Sloan 38
- **Manta:** SEL: 587 Sloan 167
- **Omicron Advanced:** SEL: 311L Sloan 161
- **Omicron Beginning:** ABB: IRD9 Sloan 163
- **Theory:** Transformer Protection Carpenter 101/102

3:00 Break - EE/ME Building outside Room 26 & B54, Automated Tracks near Sloan 7 & 169

3:10 CONTINUE LABORATORY TESTING

5:00 Adjourn

6:00 Social, No-host Bar
University Inn, Moscow

6:30 - 9:00 BANQUET AND ENTERTAINMENT
University Inn, Moscow, ID

THURSDAY, MARCH 15, 2018

7:30 HANDS-ON EXPERIENCE IN THE LAB

- **Basic:** GE: CEY51A EE/ME B54
- **Distribution:** Beckwith: M7679 EE/ME 56
- **Generation:** ABB: REG670 Sloan 169
- **Transmission:** SEL: 411L EE/ME 34
- **Electromechanical:** ABB: IRD9 Sloan 150
- **Doble Advanced:** SEL: 421 Sloan 5
- **Doble Beginning:** SEL: 311C Sloan 7
- **Enoserv Advanced:** SEL: 421 Sloan 9
- **Enoserv Beginning:** SEL: 311C Sloan 46
- **Megger:** SEL: 311C Sloan 38
- **Manta:** SEL: 311C Sloan 167
- **Omicron Advanced:** SEL: 421 Sloan 161
- **Omicron Beginning:** SEL: 311C Sloan 163
- **Theory:** Power System Operations Carpenter 101/102

10:00 Break - EE/ME Building outside Room 26 & B54, Automated Tracks near Sloan 7 & 169

10:10 CONTINUE LABORATORY TESTING

12:00 Lunch on your own

1:00 HANDS-ON EXPERIENCE IN THE LAB

- **Basic:** SEL: 551 EE/ME B54
- **Distribution:** SEL: 387 EE/ME 56
- **Generation:** GE: CEH51 Sloan 169
- **Transmission:** SEL: 411L EE/ME 34
- **Electromechanical:** GE: CEB52 Sloan 150
- **Doble Advanced:** SEL: 421 Sloan 5

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- **Doble Beginning:** SEL: 311C Sloan 7
- **Enoserv Advanced:** SEL: 421 Sloan 9
- **Enoserv Beginning:** SEL: 311C Sloan 46
- **Megger:** SEL: 311C Sloan 38
- **Manta:** SEL: 311C Sloan 167
- **Omicron Advanced:** SEL: 421 Sloan 161
- **Omicron Beginning:** SEL: 311C Sloan 163
- **Theory:** End-to-End Testing Carpenter 101/102

3:00 Break - EE/ME Building outside Room 26 & B54, Automated Tracks near Sloan 7 & 169

3:10 CONTINUE LABORATORY TESTING

5:00 Adjourn
Dinner on your own

FRIDAY, MARCH 16, 2018

*All tracks will convene in
Todd Hall 116 for this day*

7:30 REVIEW OF THE WEEK

7:45 FEATURE PRESENTATION
Protection System Misoperations, Rich Bauer, NERC

9:00 Break

9:15 FEATURE PRESENTATION
CCVT Transients – Kevin Gowan, Puget Sound Energy

10:30 ADJOURN

**PLEASE TURN IN YOUR EVALUATIONS!
THANK YOU!**