



## “Fundamentals of Air System Design”

### Course Information Package

When: April 10<sup>th</sup> and 11<sup>th</sup>, 2018 (Please see Page 2 for the planned schedule.)

Where: Park Town Hotel (924 Spadina Crescent East, at the corner of Spadina and 25<sup>th</sup> Street, right by the University Bridge).

Course Content: Please see Page 3 for the Course Content.

Instructor: Ryan MacGillivray, M.Sc., P.Eng. (Principal Engineer at Daniels Wingerak Engineering). Please see Page 4 for Ryan’s profile.

Cost: \$350 for ASHRAE members, \$450 for non-members, or \$150 for students

Note that all course attendees will receive complimentary tickets for attending the ASHRAE Chapter Meeting on Tuesday, April 10<sup>th</sup> at Park Town Hotel. Please see Page 2 for the agenda.

Course Organizer: Contact Ahmed Abdel-Salam ([ahmed.abdel-salam@usask.ca](mailto:ahmed.abdel-salam@usask.ca) or (306) 850-1527) for more information.

## ASHRAE Saskatoon Course “Fundamentals of Air System Design”

### Course Schedule

#### Day 1: April 10, 2018

<u>Start</u>	<u>End</u>	<u>Course Time</u>	<u>Event</u>
7:45 AM	8:15 AM		Registration / Set-Up
8:15 AM	10:00 AM	1.75	Course Instruction
10:00 AM	10:15 AM		Coffee Break
10:15 AM	12:00 PM	1.75	Course Instruction
12:00 PM	12:30 PM		Lunch
12:30 PM	3:00 PM	2.50	Course Instruction
3:00 PM	3:15 PM		Coffee Break
3:15 PM	5:00 PM	1.75	Course Instruction

Day 1 of the course ends at 5:00 PM. All course attendees will receive complementary tickets for attending the ASHRAE Saskatoon Chapter Meeting starting at 5:30 PM.

#### ASHRAE Meeting: April 10, 2018

<u>Start</u>	<u>End</u>	<u>Event</u>
5:30 PM	6:00 PM	Cocktails
6:00 PM	7:00 PM	Dinner
7:00 PM	8:00 PM	Meeting and Presentation on Free Cooling

#### Day 2: April 11, 2018

<u>Start</u>	<u>End</u>	<u>Course Time</u>	<u>Event</u>
8:00 AM	8:15 AM		Set-Up
8:15 AM	10:00 AM	1.75	Course Instruction
10:00 AM	10:15 AM		Coffee Break
10:15 AM	12:00 AM	1.75	Course Instruction
12:00 PM	12:30 PM		ASHRAE Lunch Meeting
12:30 PM	2:30 PM	2.00	Course Instruction
2:30 PM	2:45 PM		Coffee Break
2:45 PM	4:30 PM	1.75	Course Instruction
4:30 PM	5:00 PM		Group discussion

Day 2 of the course ends at 5:00 PM. Total Course Instruction Time: 15 hours

## ASHRAE Saskatoon Course “Fundamentals of Air System Design”

### Course Content

- **Fundamentals of Air Flow** - Static and dynamic compressible fluid (air) laws, friction effects, the friction chart, and density and altitude effects.
- **Air Distribution System Components** - System overview, air handling units, ducts, controls, air distribution devices, and sound absorbers.
- **Human Comfort and Air Distribution** - Principles of human comfort, principles of space air distribution, and types of air distribution devices.
- **Relationship of Air Systems to Load and Occupancy Demands** - Operating system selection criteria, system types by heating/cooling equipment type, system type by duct configuration, economizers and outdoor air intakes.
- **Exhaust and Ventilation Systems** - Design considerations, system types, and energy recovery.
- **Air Movers and Fan Technology** - Fan principles, fan drives, fan selection, fan installation design, fan controls and the effect of variable resistance devices.
- **Duct System Design** - Design overview, materials, construction, design and sizing, and sample systems.
- **Codes and Standards** - Building code requirements, ASHRAE Standard 90.1-2016, ASHRAE Standard 62.1-2016, other codes and standards, and sources of information.
- **Air System Auxiliary Components** - Dampers, air filters, humidifiers, duct heaters and duct insulation.
- **Sound and Vibration in Fan Systems** - Fundamentals of sound, sound and vibration sources, sound attenuation, and vibration control.
- **Air System Start-Up and Diagnostics** - Design considerations, air volumetric measurement methods, balancing procedures for air distribution systems, and noise and vibration diagnostics.
- **An Actual Duct Design Problem** - Duct design procedures, building and system, and working through the problem.

## ASHRAE Saskatoon Course “Fundamentals of Air System Design”

### Instructor Profile

Ryan M. MacGillivray, M.Sc., P.Eng.

Ryan MacGillivray is the Secretary-Treasurer, and a Principal Engineer at the mechanical consulting firm Daniels-Wingerak Engineering Ltd., in Saskatoon. The firm specializes in mechanical system design for commercial and institutional buildings, including the Children’s Hospital of Saskatchewan, office buildings, nursing homes, and university buildings. Systems include building heating, ventilation, air conditioning (HVAC), controls, fire protection, plumbing, and medical gas. Prior to joining Daniels-Wingerak Engineering Ltd. in 2002, Ryan was a Research Assistant and Sessional Lecturer at the University of Saskatchewan, where he received his B.E and M.Sc. degrees in Mechanical Engineering in 1999 and 2005. He has been registered as a Professional Engineer in Saskatchewan since 2005, with Permission to Consult since 2011. Ryan is also a licensed to practice in Alberta with APEGA and maintains the corporate Permit to Practice as Responsible Member. Ryan has been active with the ASRHAE Saskatoon Board of Governors since 2003, including president in 2008-09. He is currently serving as the Saskatoon Chapter Membership Promotion Chair. In addition, Ryan was on the Region XI regional executive as Regional Vice-Chair (Research Promotion), and helped organize the 2016 Chapter’s Regional Conference as General Chair. Ryan is also currently the chair of the APEGS Professional Practice Exam Committee (which oversees the Law and Ethics Seminar), and serves on the Governance Board, and the Registrar’s Advisory Committee. Ryan and his wife, Margaret, have three school-aged children, and they all enjoy golf and camping.