SHORT COURSE DETAILS

This short course is intended for anyone who would like to understand the principles involved in designing various types of heat exchangers (double tube, triple tube, shell & tube, helical, plate, and scraped surface). It will begin with the construction and applications of the different types of heat exchangers. This will be followed by methods to determine/estimate the convective heat transfer coefficients associated with different applications. A discussion of the different techniques/approaches that can be used to determine the overall performance of different heat exchangers for different system and process conditions will then be presented. This will be followed by methods to determine the appropriate heat exchanger for any particular application. Issues related to fouling and cleaning of heat exchangers will also be addressed. There will also be opportunities to see the results of the work performed through the Center for Advanced Processing and Packaging Studies (CAPPs) – http://fst.osu.edu/capps at various times during the short course.

MEETING LOCATION

The short course will be held at:
Dept. of Food, Bioprocessing & Nutrition Sciences (Schaub Hall)
North Carolina State University
400 Dan Allen Dr.
Raleigh, NC 27607
Phone: 919-515-2957
http://www.ncsu.edu/foodscience

The building (Schaub Hall) is at the corner of Dan Allen Dr. & Sullivan Dr. on the NC State University campus.

The closest airport is the Raleigh-Durham Airport (RDU). It is approximately 13 miles from NC State University.

NEARBY HOTELS

1. Holiday Inn: 919-828-0811 (1.5 miles away)
   1707 Hillsborough St., Raleigh, NC 27605
2. Clarion Hotel: 919-832-0501 (2.5 miles away)
   320 Hillsborough St., Raleigh, NC 27603
3. Holiday Inn Express: 919-854-0001 (3 miles away)
   3741 Thistledown Dr., Raleigh, NC 27606
4. Days Inn: 919-828-9081 (3 miles away)
   300 N. Dawson St., Raleigh, NC 27603
5. Ramada Inn: 919-832-4100 (3 miles away)
   1520 Blue Ridge Rd., Raleigh, NC 27607
6. Sheraton: 919-834-9900 (3 miles away)
   421 S. Salisbury St., Raleigh, NC 27601
7. Raleigh Marriott City Center: 919-833-1120 (3 miles)
   434 Fayetteville St. Mall, Raleigh, NC 27601
8. Comfort Suites: 919-854-0502 (4 miles away)
   1200 Hurricane Alley way, Raleigh, NC 27607
9. Hampton Inn & Suites: 919-233-1798 (5 miles away)
   111 Hampton Woods Lane, Raleigh, NC 27607
10. Candlewood Suites: 919-468-4222 (5 miles away)
    1020 Buck Jones Rd, Raleigh, NC 27606
**PROGRAM**

**Wednesday (May 18, 2010)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:30</td>
<td>Registration &amp; Breakfast</td>
<td></td>
</tr>
<tr>
<td>08:00</td>
<td>Welcome &amp; Introductions</td>
<td>Swartzel</td>
</tr>
<tr>
<td>08:15</td>
<td>Types of heat exchangers: Steam injection/infusion, double tube,</td>
<td>Sandeep</td>
</tr>
<tr>
<td></td>
<td>triple tube, multtube, shell &amp; tube, helical, plate, scraped</td>
<td></td>
</tr>
<tr>
<td></td>
<td>surface</td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>Convective heat transfer coefficients in different scenarios</td>
<td>Farkas</td>
</tr>
<tr>
<td>10:00</td>
<td>BREAK</td>
<td></td>
</tr>
<tr>
<td>10:15</td>
<td>Overall heat transfer coefficient, effectiveness, and exergy</td>
<td>Kumar &amp; Sandeep</td>
</tr>
<tr>
<td></td>
<td>analysis</td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td>Design considerations for double tube heat exchangers</td>
<td>Sandeep</td>
</tr>
<tr>
<td>12:00</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td>13:00</td>
<td>Design considerations for triple tube heat exchangers</td>
<td>Batmaz</td>
</tr>
<tr>
<td>14:00</td>
<td>Design considerations for shell &amp; tube heat exchangers</td>
<td>Sandeep</td>
</tr>
<tr>
<td>20:00</td>
<td>RECEPTION &amp; DINNER</td>
<td></td>
</tr>
</tbody>
</table>

**DISCLAIMER**: Under extenuating circumstances, we may have to make substitutions in times, topics, and speakers.

---

**REGISTRATION**

Name: ________________________________
Organization: _________________________
Address: _____________________________
Phone: _______________________________
E-Mail: ______________________________

<table>
<thead>
<tr>
<th></th>
<th>By Mar. 17</th>
<th>After Mar. 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>$800</td>
<td>$1,000</td>
</tr>
<tr>
<td>Govt.</td>
<td>$600</td>
<td>$800</td>
</tr>
<tr>
<td>Academia</td>
<td>$400</td>
<td>$600</td>
</tr>
</tbody>
</table>

No REFUNDS on cancellations after Mar. 17.

Mail Registration Form to:
Dr. Ken Swartzel
UltrAseptics
19 W. Hargett St., Suite 606
Raleigh, NC 27601-2937

Checks should be made payable to “UltrAseptics Inc.”
For credit card payment, call 919-889-6895

For More Information, Contact:
Dr. Ken Swartzel
ken@ultraseptics.com  919-608-5800
Dr. K.P. Sandeep
kp_sandeep@ncsu.edu   919-515-2957
Dr. Josip Simunovic
josip@ultraseptics.com  919-389-4385