

## Non-Fourier Heat Transfer

<b>Course Title</b>	<b>Non-Fourier Heat Transfer</b>
<b>Course Category</b>	<b>Research</b>
<b>Relevant Discipline(s)</b>	<b>Mechanical Engineering</b>
<b>Duration of course in equivalent integer no. of days (min 3 days, 1 day = 6 hrs of lectures/hands-on sessions)</b>	<b>3</b>
<b>Proposed dates</b>	<b>Dec 11, 12, 13, 18, 19, 20</b>

<b>Brief Course Description and Course Contents</b>
<p>The course will introduce the heat transfer regime where Fourier's law is no longer applicable and the equations that govern non-Fourier heat transfer. Regular lectures will be supplemented with hands-on training on solving the non-Fourier equations. Content is below:</p> <ol style="list-style-type: none"> <li>1. Review of Fourier's law of heat conduction</li> <li>2. Review of the temperature dependence of thermal conductivity</li> <li>3. Breakdown of Fourier's law and its relevance at the nano to the micro length scale</li> <li>4. Heat carriers in metallic and nonmetallic solids</li> <li>5. Introduction to the diffusive, ballistic, and quasi-ballistic regime,</li> <li>6. Introduction to measurement techniques of heat transport at the nanoscale covering the transition from quasi-ballistic to ballistic regime</li> <li>7. Boltzmann transport equation of heat transport (<b>Hands-on training portion</b>)</li> <li>8. Monte Carlo solution of the Boltzmann transport equation in ballistic and quasi-ballistic regime (<b>Hands-on training portion</b>)</li> <li>9. Hyperbolic heat conduction and dual-phase lag model of heat transport</li> </ol>

<b>Instructor Details</b>			
<b>S. No.</b>	<b>Name of the Instructor</b>	<b>Department</b>	<b>Email</b>
1	Dipanshu Bansal	Mechanical Engineering, IIT Bombay	<a href="mailto:dipanshu@iitb.ac.in">dipanshu@iitb.ac.in</a>