

The University of Western Ontario  
Faculty of Engineering  
**Biomedical Engineering Program, Faculty of Engineering**

**BME 9528 – Lab-on-a-chip Technology**

**COURSE OUTLINE –2008-2009**

---

---

<b>OBJECTIVES:</b>	Microfluidics-based Lab-on-a-chip is an emerging and rapidly growing technology. Lab-on-a-chip technology has been widely applied to biology, chemistry and clinical diagnosis. In this course, students will learn principles of micro- and nano-scale transport phenomena, and design, modeling, fabrication, characterization and operation of Lab-on-a-chip devices.						
<b>PREREQUISITES:</b>	None.						
<b>ANTIREQUISITES:</b>	None.						
<b>TOPICS:</b>	<ol style="list-style-type: none"><li>1. Introduction and overview of Lab-on-a-chip technology</li><li>2. Review of fluid mechanics theory</li><li>3. General scale effects in microfluidic systems</li><li>4. Interfacial phenomena and intermolecular forces in microfluidic systems</li><li>5. Microfabrication of Lab-on-a-chip devices:<ul style="list-style-type: none"><li>• silicon-based microfabrication</li><li>• polymer-based microfabrication</li><li>• other emerging microfabrication methods</li></ul></li><li>6. Assembly and Packaging of Lab-on-a-chip Devices</li><li>7. Microflow characterization</li><li>8. Design of Lab-on-a-chip elements</li><li>9. Digital microfluidic Lab-on-a-chip devices</li><li>10. Lab-on-a-chip applications in biomedical research</li><li>11. Lab-on-a-chip applications in clinical diagnosis</li></ol>						
<b>CONTACT HOURS:</b>	3 lecture hours and 2 tutorial hours per week, half course.						
<b>TEXTBOOK(S):</b>	<ol style="list-style-type: none"><li>1. Nam-Trung Nguyen, <i>Fundamentals and applications of microfluidics</i>, Boston : Artech House, c2006.</li><li>2. George A. Truskey, Fan Yuan, David F. Katz, <i>Transport Phenomena in Biological Systems</i>, Prentice Hall, 2004.</li></ol>						
<b>REFERENCES:</b>	<i>Instructor to suggest, if any.</i>						
<b>COMPUTING:</b>	<i>Instructor to suggest, if any.</i>						
<b>EVALUATION:</b>	<p>The course grade will be determined according to the following: The course grade will be based on homework assignments, presentations of research papers and technical report.</p> <table><tr><td>Homework assignments</td><td>30%</td></tr><tr><td>Presentations of research papers</td><td>20%</td></tr><tr><td>Term Project (technical report)</td><td>50%</td></tr></table>	Homework assignments	30%	Presentations of research papers	20%	Term Project (technical report)	50%
Homework assignments	30%						
Presentations of research papers	20%						
Term Project (technical report)	50%						
<b>INSTRUCTOR:</b>	Dr. Jun Yang, SEB 3088						
<b>ATTENDANCE:</b>	Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.						
<b>PLAGIARISM:</b>	Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or						

citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

***NOTE:***

**The above topics and outline are subject to adjustments and changes as needed**