PHYS8701 Physics Experimental Techniques	
Offering Department	Physics
Course Co-ordinator	Prof M H Xie, Physics < mhxie@hku.hk >
Teachers Involved	Prof M H Xie, Physics Prof X D Cui, Physics Prof S J Xu, Physics Dr F C C Ling, Physics Dr M Su, Physics Dr J H C Lee, Physics Dr Y J Tu, Physics Dr Y F Chan, Electron Microscope Unit
Course Objectives	This course provides a detailed account of some common experimental techniques in physics research. It introduces the basic working principles, the operational knowhow, and the strength and limitations of the techniques.
Course Contents & Topics	This course will discuss and train students of the following techniques: 1. Noise, Data Analysis, and Computer Grid 2. Vacuum technology and deposition techniques 3. Raman spectroscopy and photoluminescence (PL) 4. Electrical Characterizations 5. Thermodynamic Methods 6. Scanning Probe Microscopy (STM and AFM) 7. Electron and X-Ray Diffraction (LEED/RHEED/XRD) 8. Photoemission Spectroscopy (PES) 9. Scanning Electron Microscopy (SEM) 10. Transmission Electron Microscopy (TEM) 11. Radiation Detection and Measurements in Nuclear Physics 12. Particle Detection in Space and Microwave Measurement with Superconducting Detector
Course Learning	Upon completion, students should be able to:

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<tr><td>Outcomes</td><td colspan="3">1. describe and explain the working principles of the various techniques
2. identify the strength and limitation of each technique, therefore, choose the right technique for characterization of properties
3. know the operational details and interpret the data obtained by the techniques</td></tr>
<tr><td>Pre-requisites (and Co-requisites and Impermissible combination)</td><td colspan="3">---</td></tr>
<tr><td>Offer in 2017 - 2018</td><td>Y 2nd sem</td><td>Examination</td><td>To be confirmed</td></tr>
<tr><td>Offer in 2018 - 2019</td><td colspan="3">Y</td></tr>
<tr><td>Course Grade</td><td colspan="3">Pass/Fail</td></tr>
<tr><td>Grade Descriptors</td><td colspan="3"><table>
<tr><td>Pass</td><td>Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.</td></tr>
<tr><td>Fail</td><td>Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.</td></tr>
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<tr><td>Course Type</td><td colspan="3">Lecture-based elective course</td></tr>
<tr><td>Course Teaching & Learning Activities</td><td colspan="3"><table>
<tr><th>Activities</th><th>Details</th><th>No. of Hours</th></tr>
<tr><td>Lectures</td><td></td><td>36</td></tr>
<tr><td>Demonstrations of some selective techniques</td><td></td><td>4</td></tr>
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<tr><td>Assessment Methods and Weighting</td><td><table>
<tr><th>Methods</th><th>Details</th><th>Weighting in final course grade (%)</th></tr>
<tr><td>Presentation</td><td></td><td>50</td></tr>
<tr><td>In class quizzes</td><td></td><td>50</td></tr>
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<tr><td>Required/recommended reading and online materials</td><td>---</td></tr>
<tr><td>Additional Course Information</td><td>---</td></tr>
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