Subject Description Form

Subject Code	FSN1001
Subject Title	Essential Laboratory Practices
Credit Value	1
Level	1
Pre-requisite	NIL
Objectives	To introduce the common techniques and safety practices required in laboratories.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Demonstrate the familiarity towards common laboratory techniques; b. Compile proper laboratory records from the observations made in experiments; c. Observe general laboratory safety practices; d. Pass the online safety training for both Chemical and Biological Safety.
Subject Synopsis/ Indicative Syllabus	**Laboratory Safety** - General laboratory safety practices. - Equipment designed to reduce biological hazards. - General knowledge on the handling, storage and disposal of chemicals and chemical wastes. - Personal protection and protective clothing. - Use of emergency facilities. **Essential Laboratory Techniques** - Use of pH meter, analytical balances, graduated glassware; water for laboratory use; concentrations and calculation; preparation of laboratory solutions, reagents and standard solutions. - Microscopy: principles of light microscopy; proper use and care of light microscopes; preparation of slides for microscopy; - Centrifugation: principle of centrifugation, different modes of centrifugation, use of centrifugation in separation of cells or subcellular particles. - Bacterial culture medium and culture plates, culture transfer and cultivation, plate streaking/spreading; serial dilution and growth curve. - Acid-base titration and precipitation titration. - Measurements involving light: transmission, absorption, principle of spectrophotometry, use of spectrophotometer; standard curves and calibration. - Proper record keeping and documentation; Proper data analysis and report writing

<table>
<tr><td>Teaching/Learning Methodology</td><td>The basic principles of laboratory safety will be delivered in the form of lectures. To practice, students will work individually or in teams in the laboratory sessions, and each session will be supplemented with in-lab briefing and demonstration. Each student will be required to keep record of the laboratory works in the form of a laboratory notebook.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="5">Intended subject learning outcomesto be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td></tr>
<tr><td>1. Lab reports</td><td>40%</td><td>√</td><td></td><td>√</td><td></td><td></td></tr>
<tr><td>2. Lab Logbook</td><td>20%</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>3. Lab Performances</td><td>30%</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>4. Quiz</td><td>10%</td><td></td><td></td><td></td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="5"></td></tr>
</table>
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Laboratory reports: students are expected to perform analysis on the data obtained as well as to interpret their findings. Their abilities in these aspects may thus be assessed.

Laboratory notebook: students will be assessed on their record keeping and accuracy in observation.

Lab performance: students will be monitored during the laboratory sessions on their lab performance and assessed to evaluate their mastering of the basic techniques and their practice of laboratory safety.

Quiz: students will be assessed on their understanding of the principles of the laboratory safety</td></tr>
<tr><td>Student Study Effort Required</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>Lecture</td><td>3 Hrs.</td></tr>
<tr><td>Laboratory Sessions</td><td>15 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>Self study</td><td>20 Hrs.</td></tr>
<tr><td>Total Study Effort:</td><td>38 Hrs</td></tr>
</table>
</td></tr>
<tr><td>Reading List and References</td><td>Laboratory Biosafety Manual, Second Edition (Revised); World Health Organization, Geneva 2003

Fleming & Hunt (Editors) Biological Safety Principles and Practices 4th Edition ASM Press 2006</td></tr>
</table>

	Hall, Stephen K.; Chemical Safety in the Laboratory; Boca Raton, Fla.: Lewis Pubishers, 1994 Norrell & Messley Microbiology Laboratory Manual Second Edition Pearson 2003 Vogel, A. I.; Barnes, J. D.; Denney, R. C.; Mendham, J.; Thomas, M. J. K. Vogel's Quantitative Chemical Analysis, 6th edition, Harlow: Prentice Hall, 2000