## Subject Description Form

<table>
<thead>
<tr>
<th><strong>Subject Code</strong></th>
<th>AMA105</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject Title</strong></td>
<td>Logic : Qualitative and Quantitative</td>
</tr>
<tr>
<td><strong>Credit Value</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Pre-requisite/ Co-requisite/ Exclusion</strong></td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Objectives

This subject aims to develop students’ ability in logical and analytical thinking through the qualitative and quantitative aspects of logic. The first part will emphasize qualitative logic and will be taught by the General Education Centre. The objective of this part is to relate formal logic to arguments expressed in natural language, with special emphasis on how to evaluate arguments critically with the help of logic. The second part will emphasize quantitative logic. Some topics from discrete mathematics will be presented as illustrations of the general theory. This part will be taught by the Department of Applied Mathematics.

### Intended Subject Learning Outcomes

Upon completion of the subject, students will be able to:

1. demonstrate basic logical reasoning
2. translate arguments in natural language to the language of formal logic and then evaluate whether the arguments are valid or not with the help of logical analysis
3. apply logical reasoning in both everyday and academic situations
4. recognize and refute common logical fallacies
5. appreciate the axiomatic approach in mathematics
6. analyze and appreciate why proofs of mathematical statements work
7. apply logical reasoning in problem solving

### Subject Synopsis/ Indicative Syllabus

**Keyword Syllabus:**

1. **Qualitative Logic**
2. **Quantitative Logic**
   - Sets and propositions; Relations and Functions; Natural Numbers, Integers and Rational Numbers.

### Teaching/ Learning Methodology

1. **Qualitative Logic**
   - Introduction to the key concepts and basic principles of formal logic will be done primarily through lectures. Emphasis will be put on practical applications of these concepts and principles in everyday life, drawing updated examples from newspapers, magazines and everyday discourses and arguments, sometimes with video clips taken from television.

   Small group tutorials will be devoted to discussion of exercises and/or case studies relevant to the key concepts and basic principles introduced in the lectures. Finally, self-study will be encouraged through extra exercises which are computer-based and accessible to students. Assessment will be in the form of in-class mid-term tests as well as exercises or group projects associated with tutorials.
All exercises and case-studies are designed to help students achieve at least one of the intended learning outcomes; whereas the tests and the examination are designed to assess whether students have achieved all the learning outcomes as a whole.

2. Quantitative Logic
A two hour mass lecture will be conducted each week to initiate students into the ideas, concepts and techniques of the topics in the syllabus, which is then reinforced by a one hour tutorial designed to consolidate and develop students’ knowledge through discussion and practical problem solving.

### Alignment of Assessment and Intended Subject Learning Outcomes

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>% Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Assessment</td>
<td>40%</td>
</tr>
<tr>
<td>2. Final Examination</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
</table>

Continuous Assessment comprises of exercises/case studies, in-class/online quizzes and tests. A 2-hour examination is held at the end of the semester.

Questions in the exercises, tests and examination are set to test students’ ability with regard to any one of the intended learning outcomes.

To pass this subject, students are required to obtain Grade D or above in both the Continuous Assessment and the Examination components.

### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Class contact (time-tabled):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lecture</td>
</tr>
<tr>
<td>• Tutorial</td>
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</table>

**Total student study effort:** 42 Hours

### Reading List and References

**Textbook:**

Qualitative Logic

Quantitative Logic

**Reference List:**

|---|---|