### Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>EIE2211 (for 42470)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Logic Design</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>2</td>
</tr>
<tr>
<td>Pre-requisite/Co-requisite/Exclusion</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Objectives
To provide students with a broad view in both hardware and software aspects of digital systems in general and microprocessor systems in particular, and enable them to gain understanding and skills that will be used in later computer related courses. Emphasis will be placed on topics including:

1. Common binary logic components found in a microcomputer system
2. Use and applications of programmable logic devices
3. Structure and organization of microprocessors

### Intended Subject Learning Outcomes
Upon completion of the subject, students will be able to:

**Category A: Professional/academic knowledge and skills**
1. Understand the fundamentals of digital systems and associated technologies.
2. Analyse and design simple systems related to digital logic.
3. Apply logic design techniques to construct digital systems with programmable logic devices and microprocessors, and appreciate the use of them.
4. Appreciate the importance of creativity and critical thinking on finding “good” solutions or making “good” designs.

**Category B: Attributes for all-roundedness**
5. Think critically.

### Subject Synopsis/Indicative Syllabus

**Syllabus:**

1. Logic Circuit and ICs
   - 1.1 Decoders and encoders
   - 1.2 Multiplexers and demultiplexers
   - 1.3 Binary adders, binary adder-subtractors
   - 1.4 Binary multipliers
   - 1.5 Sequential circuit analysis and design
   - 1.6 Registers and counters
   - 1.7 HDL representation.

2. Memory and Programmable Logic Devices
   - 2.1 RAM: Write and read operations, timing waveforms, RAM integrated circuits, three-state buffers, DRAM ICs
   - 2.2 Programmable logic technologies
   - 2.3 ROM, PLA and PAL
   - 2.4 VLSI programmable logic devices: Xilinx FPGA.

3. Microprocessor
   - 3.1 Register transfer operations
   - 3.2 Microoperations
   - 3.3 Bus-based transfer
   - 3.4 ALU
   - 3.5 Shifter
   - 3.6 Datapath representation
   - 3.7 Control word
### Laboratory Experiment:
1. Basic logic gates and their applications
2. Hardware description language and programmable logic devices

#### Teaching/ Learning Methodology

<table>
<thead>
<tr>
<th>Teaching and Learning Method</th>
<th>Intended Subject Learning Outcome</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>1, 2, 3, 4</td>
<td>Fundamental principles and key concepts of the subject are delivered to students.</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1, 2, 3, 4, 5</td>
<td>Supplementary to lectures and are conducted with smaller class size. Students will be able to clarify concepts and to have a deeper understanding of the lecture materials. Problems and application examples are given and discussed.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>1, 2, 3, 4, 5</td>
<td>Students will make use of the software and hardware tools to develop simple digital systems, perform simulations</td>
</tr>
</tbody>
</table>

#### Assessment Methods in Alignment with Intended Subject Learning Outcomes

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>% Weighting</th>
<th>Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuous Assessment</td>
<td>50%</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>• Assignments</td>
<td></td>
<td>✓ ✓</td>
</tr>
<tr>
<td>• Tests</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>• Laboratory sessions</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>2. Examination</td>
<td>50%</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
The continuous assessment will consist of a number of assignment, lab reports, and two tests.

**Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:**

<table>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments, tests and examination</td>
<td>End-of chapter type problems used to evaluate students’ ability in applying concepts and skills learned in the lessons. Students need to think critically and creatively in order to come up with solutions for existing problems.</td>
</tr>
<tr>
<td>Laboratory sessions</td>
<td>Each student is required to do a demonstration.</td>
</tr>
</tbody>
</table>

**Student Study Effort Expected**

**Class contact (time-tabled):**

- Lecture: 24 Hours
- Tutorial/Laboratory/Practice Classes: 15 hours

**Other student study effort:**

- Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination: 36 Hours
- Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing: 30 Hours

**Total student study effort:** 105 Hours

**Reading List and References**

**Textbooks:**


**Reference Books:**


**Last Updated**

June 2014

**Prepared by**

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