<table>
<thead>
<tr>
<th>Subject Code</th>
<th>IC367</th>
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<tbody>
<tr>
<td>Subject Title</td>
<td>Industrial Centre Training II for EIE</td>
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<tr>
<td>Credit Value</td>
<td>4 training credits</td>
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<tr>
<td>Level</td>
<td>3</td>
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<tr>
<td>Pre-requisite</td>
<td>Student who have completed a minimum of two level-2 subjects in EIE; electronics, data communications, computer programming, microprocessor and logic design, electronic instrumentation or equivalent.</td>
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<tr>
<td>Co-requisite/Exclusion</td>
<td>Nil</td>
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### Objectives

The objective of this course is to nurture and develop practical skills and technical competence for students to practice in electronic & information engineering.

### Intended Subject Learning Outcomes

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

1. commence and manage EIE projects includes; planning, specification, market study, costing and working prototype fabrication from raw material or basic components;
2. attain confidence and technical competence in the design, construction, testing and commissioning of projects in EIE;
3. design presentations in EIE projects in varies stages for communication, control and commissioning;
4. apply teamwork skills in a product development team proactively and professionally.

### Contribution of the Subject to the Attainment of the Programme Outcomes

**Programme Outcomes:**

**Category A: Professional/academic knowledge and skills**

- Programme Outcomes 1, 2, 3, 4, 5, 8, 9, 11 and 12: This subject contributes to the programme outcome through practical training on the professional practice in the design, development, fabrication, test and troubleshooting of electronic or information equipment or products under an international recognized professional engineer training centre.
- Programme Outcomes 1, 3, 5 and 8: This subject contributes to the programme outcome through practical project training. Students will learn to apply knowledge in engineering studies and that from previous training to execute a design project from scratch. Consultation and supervision will be kept at a minimum level or that close to application engineering level in the industry so as to enable the development of students’ ability to identify, formulate and solve engineering problems. Students will aware industrial safety, environmental and sustainability issues in the design project through reflections and report.
- Programme Outcome 4: This subject contributes to the programme outcome through design realization in multidisciplinary workshops.
- Programme Outcome 6: This subject contributes to the programme outcome through induction and practice in Industrial Centre. Student will practice the protocol and experience discipline as demanded in a workshop context with the importance of training, responsibility and ethics for a professional engineer.
- Programme Outcome 7: This subject contributes to the programme outcome through training in groups, discussions, report and logbook writing. Students will be required to present ideas and project for an audience and on Web.
- Programme Outcome 10: This subject contributes to the programme outcome through induction and practical training. Minimal supervision environment on design project should bring up the awareness and
cognition in self-learning and life-long learning as demanded for a professional career.

- Programme Outcomes 11 and 12: This subject contributes to the programme outcome through practical design project. Students must use the techniques, skills and tools in electronic and information engineering to achieve the objectives and solve design problem for the delivery of project.

**Category B: Attributes for all-roundedness**

- Programme Outcome 13: This subject contributes to the programme through practical training. In training tasks, student will perform practical tasks on creative design and process with realistic constraint and work through its implementation.
- Programme Outcome 14: This subject contributes to the programme outcome through practical project in student groups. Students must exercise team work skills to demonstrate leadership ability, critical thinking ability and creativity through working with each other to complete the project.

### Subject Synopsis/Indicative Syllabus

**Syllabus:**

1. **Integrated Training in Electronic & Information Engineering (TM1103 - 4 weeks)**
   1.1 The technical domain of the project can be selected from any areas within the scope of electrical, electronic and information engineering with appropriate complexity and workload. It usually covers the technical aspect of products and systems in consumer electronics, communication electronics, information systems, power electronics and mechatronics.
   1.2 The activities in projects include market studies, project proposal, project management, presentation, documentation and drawings, system design, mechanical design, circuit design, calculations, simulation, emulation, debugging, troubleshooting, prototype fabrication, installation, test and commissioning.
   1.3 The deliverable of the project will include a working prototype, electronic documentation with the creation and management of a project web site.
   1.4 Hardware design may include that of the following; embedded systems, printed-circuit board design and assembly, application of application specific integrated circuit (ASIC), field programmable gate array (FPGA), programmable logic devices (PAL), sensors, amplifiers, chopper, drivers, actuators, signal processors, transceivers, filters, analogue and digital convertors (ADC/DAC).
   1.5 Mechanical design may include parts and chassis design, electronic packaging and thermal design, chassis, presentation, vibration and noise control, mounting and that for the fabrication of the prototype.
   1.6 Software design includes embedded software, web interface, user interface, communication link design and protocol, error control, cryptographic and security application and application software for system operation.

**Teaching/Learning Methodology**

The teaching and learning methodology takes the form of technical projects with typically 3 to 6 students in a team working in the Industrial Centre for a minimum of 4 weeks. The project simulates commercially oriented project team being assigned the task to design and build electronic or IT product for a client. The team has to conduct a market research to come up with an appropriate design and marketing strategy. The project approach of IC Training II provides an arena for students to develop their personal ability and attitude in teamwork and leadership for real world industrial environment. Projects are structured so that student can bring their training, knowledge, creativity and experience together and consolidate them into one coherent activity.

The technical complexity of projects is comparable to that in the industry. Typically, a project starts out from obtaining basic information on the application of commercially available parts including semiconductors or that at
Students will need to deliver the project from project proposal to finish a working prototype. On completion of the project, students have walked through the entire process of a typical, pragmatic industrial project. Students should be able to acquire necessary confidence and competence in the design, construction, testing and commissioning of industrial projects in EIE.

In the course of the project, the project group has to complete necessary project documentation including test data sheet, operation & maintenance manual and submit technical report. At the end of the training period, the team has to create a Web site and present their achievement, manufacturing plan and business plan of this product. This will provide opportunity for students to communicate ideas and project documentation professionally. Every student will be required to write a report to reflect their contribution and attainment in the project. This helps to distribute the workload of the project while nurturing teamwork.

<table>
<thead>
<tr>
<th>Specific Assessment Methods/ Task</th>
<th>% Weighting</th>
<th>Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td></td>
<td>1  2  3  4</td>
</tr>
<tr>
<td>• Project Development and Technical Work</td>
<td>35%</td>
<td>✓  ✓  ✓  ✓</td>
</tr>
<tr>
<td>• Project Presentation and Documentation</td>
<td>30%</td>
<td>✓  ✓  ✓  ✓</td>
</tr>
<tr>
<td>• Project Prototype Design, Construction and Demonstration</td>
<td>20%</td>
<td>✓  ✓  ✓  ✓</td>
</tr>
<tr>
<td>• Reflective Journal</td>
<td>15%</td>
<td>✓  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject is based on 100% continuous assessment. Assessed components included project documentation, demonstration and prototype. The function and construction of the prototype will be assessed with standing industrial practice. In addition to group assessment, students will be assessed individually for their participation in the project, role and technical competence through their work and reflective journals.

<table>
<thead>
<tr>
<th>Class contact (time-tabled):</th>
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<tbody>
<tr>
<td>• Lecture</td>
<td>4 Hours</td>
</tr>
<tr>
<td>• Tutorial</td>
<td>20 Hours</td>
</tr>
<tr>
<td>• Workshop</td>
<td>96 Hours</td>
</tr>
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Other student study effort:

| Report and Literature Review            | 60 Hours    |

Total student study effort: 180 Hours

References:

**Reference Software:**

1. PADS from Mentor Graphics Inc.
2. LabVIEW from National Instrument
3. MPLAB from Microchip Corp.